Volume I: Final Environmental Impact Assessment Report

Proposed Boshoek Solar 1 Solar Energy Facility and associated Infrastructure, North West Province

PREPARED FOR

DFFE Reference: 14/12/16/3/3/2/2508

FINAL FOR DFFE DECISION

DATE

28 August 2024

REFERENCE

0697978

DOCUMENT DETAILS

DOCUMENT TITLE	Volume I: Final Environmental Impact Assessment Report
DOCUMENT SUBTITLE	Proposed Boshoek Solar 1 Solar Energy Facility and associated Infrastructure, North West Province
PROJECT NUMBER	0697978
Date	28 August 2024
Version	1.0
Author	Lucien Barbeau, Stephen Burton
Client name	Boshoek Solar 1 (Pty) Ltd

DOCUMENT HISTORY

				ERM APPROVAL TO ISSUE		
VERSION	REVISION	AUTHOR	REVIEWED BY	NAME	DATE	COMMENTS
1.0	Draft for client review	Lucien Barbeau	Dieter Rodewald	Dieter Rodewald	14/08/2024	Draft for client consideration

SIGNATURE PAGE

Volume I: Final Environmental Impact Assessment Report

Proposed Boshoek Solar 1 Solar Energy Facility and associated Infrastructure, North West Province

0697978

[Double click to insert signature]

Stephanie Gopaul
Partner and Registered EAP

[Double click to insert signature]

Dieter Rodewald
Partner

ERM Southern Africa (Pty) Ltd.
1st Floor
Great Westerford
240 Main Road, Rondebosch
Cape Town, 7700
South Africa
T +27 21 681 5400

© Copyright 2024 by The ERM International Group Limited and/or its affiliates ('ERM'). All Rights Reserved.
No part of this work may be reproduced or transmitted in any form or by any means, without prior written permission of ERM.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

Acronyms	Description
BESS	Battery Energy Storage System

Acronyms	Description
CA	Competent Authority
CARA	Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
dB	Decibel
DFFE	Department of Forestry, Fisheries and the Environment (National)
DMRE	Department of Mineral Resources and Energy
DoE	Department of Energy
DHSWS	Department of Human Settlement, Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, 1989 No. 73 of 1989)
EGI	Electricity Grid Infrastructure
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
ESA	Early Stone Age
ESKOM	Eskom Holdings SOC Limited
EWT	Endangered Wildlife Trust
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kV	Kilovolt
kWh	Kilowatt Hours
LSA	Late Stone Age
MSA	Middle Stone Age
MW	Megawatt
NCR	Noise Control Regulations
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)

Acronyms	Description
NPAES	National Protected Area Expansion Strategy
NSD	Noise-sensitive Development
NWA	National Water Act, 1998 (Act No. 36 of 1998)
OES	Ostrich Eggshell
PAOI	Project Area of Influence
PES	Present Ecological State
PPP	Public Participation Process
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SAWS	South African Weather Service
SCADA	Supervisory Control and Data Acquisition
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEF	Solar Energy Facility
SEI	Site Ecological Importance
SIA	Social Impact Assessment
SR	Scoping Report
WULA	Water Use License Application

PROJECT DETAILS

DFFE Reference	**14/12/16/3/3/2/2508**		
ERM Reference	0697978 Boshoek Solar (1 – 3) Cluster		
Project Title	Boshoek Solar 1 Solar Energy Facility and associated Infrastructure, including a Grid Connection		
EAP	Stephanie Gopaul	Environmental Resource Management Southern Africa (Pty) Ltd	
Consultant	Lucien Barbeau	Environmental Resource Management Southern Africa (Pty) Ltd	
Specialist Team	Specialist	Specialist Study	Organisation
	Soil, Land Use and Agricultural Potential	Johann Lanz	Independent Consultant
	Freshwater and Wetlands	Gerhard Botha	Nkurenkuru Ecology and Biodiversity
	Terrestrial Ecology (Flora and Fauna)	Gerhard Botha	Nkurenkuru Ecology and Biodiversity
	Avifauna	Ryno Kemp	The Biodiversity Company
	Visual / Landscape	Graham A Young	GYLA
	Heritage, Archaeology and Palaeontology	Jessica Angel	PGS Heritage
	Socio-Economic	Cornelius Holtzhausen	Savannah Environmental (Pty) Ltd
	Traffic and Transportation	Stephen Fautley	Techso (Pty) Ltd
Project Applicant	Boshoek Solar 1 (Pty) Ltd		
Report Status	EIA REPORT – Final for DFFE Decision		

PUBLIC PARTICIPATION DETAILS

The Final Environmental Impact Assessment (EIA) Report, with the required application form, has been submitted to the Department of Forestry, Fisheries and the Environment (DFFE), acting as the Competent Authority (CA).

Members of the public, local communities, and stakeholders were invited to comment on the Draft EIA Report available for public review and comment for a period of 30 days.

EXECUTIVE SUMMARY

Environmental Resource Management Southern Africa (Pty) Ltd (ERM) has been appointed by Boshoek Solar 1 (Pty) Ltd, to undertake an Environmental Impact Assessment (EIA) to meet the requirements under the National Environmental Management Act (Act 107 of 1998) (NEMA), Environmental Impact Assessment (EIA) Regulations, for the proposed development of a solar photovoltaic (PV) energy facility (SEF), including the relevant grid solution, located near Rustenburg in the North West Province, namely the Boshoek Solar 1 Solar Energy Facility (SEF).

SITE LOCATION AND PROPOSED DEVELOPMENT DESCRIPTION

The Boshoek Solar 1 SEF is located approximately 33 km northwest of Rustenburg within the Kgetlengrivier and Rustenburg Local Municipalities and the Bojanala District Municipality, in the North West Province.

The proposed Boshoek Solar 1 SEF will consist of the components listed 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 design phase prior to construction (subsequent to the issuing of an Environmental Authorisation (EA), should such an authorisation be granted), but that the information provided below is seen as the worst-case scenario.

Boshoek Solar 1 SEF and Grid Connection components: – 150 MW

- PV modules (mono- or bifacial) and mounting structures;
- Inverters and transformers;
- Battery Energy Storage System (BESS);
- Site access road;
- Internal access roads;
- Auxiliary buildings (switch room, gatehouse and security, control center, office, warehouse, canteen & visitors center, staff lockers etc.);
- Temporary and permanent laydown area;
- Grid connection infrastructure, including:
  - Underground medium-voltage cabling between the project components and the facility substation.
  - Up to 132 kV facility on-site substation.
  - Up to 132 kV on-site switching station.
  - A single circuit 132 kV power line from the switching station to the future planned Eskom collector switching station ~3.5 km north-east of the site.

ENVIRONMENTAL LEGISLATIVE REQUIREMENTS

The EIA Regulations, 2014, published in Government Notice (GN) No. R. 982 as amended provide for the control of certain Listed Activities. These activities are listed in GN No. R. 983 (Listing Notice 1 - Basic Assessment), R. 984 (Listing Notice 2 - Scoping & EIA Process) and R. 985 (Listing Notice 3 - Basic Assessment) of 4 December 2014 and are prohibited to proceed until EA has been obtained from the competent authority, in this case, the Department of Forestry, Fisheries and the Environment (DFFE).

On 7 April 2017 in Government Gazette 40772 the Minister of Environmental Affairs published amendments in Government Notice (GN) Number R. 326 to the Environmental Impact Assessment (EIA) Regulations of 2014 that provide for the control of certain Listed Activities. These activities are listed in Listing Notice 1 (GN R327), Listing Notice 2 (GN R325) and Listing Notice 3 (GN R324). Activities triggered within Listing Notice 1 and 3 require Basic Assessment; activities within Listing Notice 2 require a Scoping & EIA (S&EIA) Process.

As the proposed Boshoek Solar 1 SEF and associated infrastructure triggers Activities in Listing Notices 1 – 3 and does not fall within a Renewable Energy Development Zone (REDZ), a full S&EIA process will be followed.

Listed Activities applicable to the proposed Boshoek Solar 1 SEF and associated infrastructure are presented in the table below. All potential impacts associated with these Listed Activities have been considered and assessed as part of this S&EIA process.

APPLICABLE LISTED ACTIVITIES IN TERMS OF THE NEMA, AS AMENDED

Listing Notice (LN)	Activities
LN 1: GNR 327	11(i); 12 (ii, a, c); 19 (i); 24 (ii); 28 (ii); 48 (i, a, c); and 56 (i).
LN 2: GNR 325	1; and 15.
LN 3: GNR 324	4 (h)(iv), 12 (h)(iv),14 (ii) (h)(iv), 18 (h) (v), 23 (ii)(h)(iv)

Depending on the final design of the Boshoek Solar 1 SEF and associated infrastructure, there may be a requirement for the following additional permits / authorisations:

- Biodiversity Permits in terms of the National Environmental Management: Biodiversity Act (Act No 10 of 2004) (NEMBA);
- Waste Management License/s as required by the NEMA, Waste Act, 2008 (Act No. 59 of 2008);
- Obstacle Permits as required by the Civil Aviation Act (Act 13 of 2009);
- Water Use Licenses as required by the National Water Act, 1998 (Act No. 36 of 1998) (NWA); and
- Heritage License in term of the National Heritage Resources Act 25 of 1999.

These permits will be applied for should the project be authorised and be selected as a preferred bidder.

ENVIRONMENTAL IMPACT ASSESSMENT PHASE

The Final Scoping Report (FSR) (ERM, February 2024) presented and assessed the initial proposed Solar PV layout and associated infrastructures of the Boshoek SEF 1 and its associated infrastructure. In May 2024 the DFFE accepted the FSR. The results of the specialists' scoping assessments, DFFE comments on the FSR, and other technical and financial constraints for the proposed development site were taken into consideration and a revised 'preferred layout' was produced.

This EIA report presents and assesses the impacts associated with the preferred layout of the Boshoek SEF 1.

SUMMARY OF SPECIALIST ASSESSMENTS RESULTS

Each of the specialist assessments followed a systematic approach to the identification and assessment of impacts, with the principal steps being:

- Description of existing environment / baseline conditions;
- Prediction of likely potential impacts, including cumulative impacts (both positive and negative);
- Assessment of likely potential impacts (positive and negative);
- Identification of appropriate mitigation measures; and
- Assessment of residual (potential) environmental impacts.

The individual assessment methodologies and baseline descriptions are set out in this report. The approaches are in line with the legal requirements and industry best practice guidelines and makes use of the experience and expertise of the Environmental Assessment Practitioner (EAP) and the specialists.

Studies have been completed to quantify possible impacts and magnitude of impacts related to but not limited to the soil, land, aquatic, biodiversity, landscape, heritage, socio-economic, visual and traffic and transportation and includes measures to mitigate and reduce the significance of impacts.

SOIL, LAND USE AND AGRICULTURAL POTENTIAL

The purpose of the agricultural component in the EIA process is to preserve the agricultural production potential, particularly of scarce arable land, by ensuring that the development does not exclude existing or potential agricultural production from such land or impact it to the extent that its future production potential is reduced.

An agricultural impact is a change to the future agricultural production potential of land. In most developments, including the one being assessed here, this is primarily caused by the exclusion of agriculture from the footprint of the development. Soil erosion and degradation may also contribute to loss of agricultural production potential. The significance of an agricultural impact is a direct function of the following three factors:

- The size of the footprint of land from which agriculture will be excluded (or the footprint that will have its potential decreased);
- The baseline production potential (particularly cropping potential) of that land; and
- The length of time for which agriculture will be excluded (or for which potential will be decreased).

The most significant agricultural impact possible, ignoring the length of time component, is therefore a loss of a large area of high yielding cropland and the least significant impact is a loss of a small area of low carrying capacity grazing land.

From an agricultural impact point of view, it is recommended that the proposed development be approved. The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any other conditions other than recommended mitigation.

FRESHWATER AND WETLANDS

A total of the five freshwater resource features that were identified within the 500m buffer area, one feature has a high risk of being impacted by the proposed development (grid infrastructure only), whilst one feature has a moderate risk of being impacted. Of these two freshwater resource features:

- one freshwater resource feature is a narrow intermittent stream (WC2) with a wooded riparian fringe being mostly absent to very narrow; and
- the second freshwater resource feature (WC2) is a narrow drainage lines with no riparian fringe.

Present Ecological Condition:

The aquatic report's assessment of the Present Ecological State (PES) focused on evaluating the health and integrity of river ecosystems by measuring their deviation from the reference state. This evaluation considered the concept of "habitat integrity," which involves maintaining a balanced composition of physical, chemical, and habitat characteristics comparable to natural habitats in the region. The Index of Habitat Integrity (IHI) was used as a measure of PES, covering both in-stream and riparian habitats.

The assessment involved separate evaluations of habitat integrity for in-stream and riparian habitats, based on various indicators, including water abstraction, flow modification, inundation, bed modification, bank erosion, channel modification, water quality, solid waste disposal, vegetation removal, and exotic vegetation.

The results of the IHI assessment highlighted several key findings:

- The small intermittent stream (WC1) is at high risk of impact due to the fact that this watercourse is crossed by the proposed electrical grid corridor. This watercourse has been severely modified in terms hydrology, geomorphology and vegetation structure/composition. A large portion of this drainage lines traverse pasture paddocks. Vegetation coverage and structure, within these areas, have been completely modified through the removal of almost all trees and shrubs and the replacement of the natural grass layer with palatable grazing species such as *Cenchrus ciliaris*. Portions of this watercourse have also been ripped and ploughed in the past (prior to initial reseeding) and are subjected to significant grazing pressure (small paddocks used for intensive game breeding, mainly grazers). Furthermore, this watercourse has been dammed upstream (two small gravel dams) and such dams have a profound impact on the hydrology of smaller systems. Subsequently WC1 is currently regarded as being in a Seriously Modified conditions (PES = "E").
- The short drainage line (WC2 located to the west of the project site, is at moderate risk of being impacted by the proposed development due to its close proximity to the proposed development. Limited change has occurred to the hydrological and geomorphological characteristics of this freshwater resource feature. The most significant impact is erosion; however the extent of erosion can be regarded as low to moderate-low, with isolated localities being exposed to erosion. The most likely culprit is overgrazing and the slight reduction in vegetation coverage and structure. Grazing pressure has resulted in the slight encroachment of *Senegalia mellifera*, reducing the ground cover (graminoid layer) and exposing these areas to some sheet erosion. No instream dams are present within this

watercourse and as such the hydrological character of this watercourse can be regarded as natural. Watercourse crossings are very limited and restricted to two small farm tracks. This watercourse is currently regarded as being in Largely Natural condition as reflected by a "B" PES Category.

In summary, the report's findings indicate that various watercourses and drainage lines within the study area exhibit different levels of modification, influenced by a range of natural and anthropogenic factors. Understanding these variations in habitat integrity and ecological state is essential for making informed decisions regarding conservation and management strategies for these ecosystems.

Ecological Importance and Sensitivity:

The results and findings of the Ecological Importance and Sensitivity (EI&S) assessment of the freshwater resource features reveals varying degrees of significance across the surveyed watercourses.

The small intermittent stream with a less prominent to absent riparian fringes, exhibit moderate ecological importance and sensitivity. While such systems play a crucial role in maintaining larger watercourses and reducing flood damage downstream, they are more susceptible to degradation. They support fairly low fauna diversity and are susceptible to livestock and game utilization.

The small intermittent drainage line is deemed of low ecological importance and sensitivity. This largely natural drainage line has a very low diversity of instream and riparian habitat and are unlikely to harbour any rare or endangered, unique or endemic species. The small size of the drainage lines and largely intermittent nature of flows makes this ecosystem inherently vulnerable and sensitive to changes in the timing and volume of flows and water quality modifications. Furthermore, very limited instream habitat types, and the absence of riparian habitat types to support a high diversity of biota, will have a strong limiting influence on the structure and composition of invertebrate and vertebrate communities. Even though habitat connectivity is high, the role as functional migration routes/corridors is limited due to the short distance of this watercourse and the location of a major road system just upstream of this watercourse. During times of environmental stress, the instream habitat is likely to offer limited refugia for local aquatic and terrestrial wildlife only.

In summary, the assessment underscores the ecological significance and sensitivity of different watercourses, emphasizing the importance of preserving and managing these vital habitats based on their unique characteristics and roles in supporting local ecosystems.

Recommended Ecological Category (REC) and Management Objectives for Watercourses:

The future management of the freshwater ecosystems in the project area should be guided by the 'Recommended Ecological Category' (REC) and the associated recommended management objectives for water resources. These objectives are typically based on the Present Ecological State/Ecological Category (PES/EC) and the Ecological Importance and Sensitivity (EIS) of water resources, as outlined by the Department of Water Affairs (DWAF) in 2007.

The management strategy should be tailored to the specific characteristics and context of each watercourse, considering both existing threats and potential future development pressures. Based on the rating system, the recommended management objective for both WC1 and WC2, should be to maintain the current ecological conditions of these freshwater resource features.

Freshwater Resource Buffer Zones:

Buffer zones, which are typically strips of undeveloped and vegetated land, serve a crucial role in separating development or adjacent land uses from aquatic ecosystems, including rivers and wetlands. The primary purpose of these buffers is to mitigate the impact of adjacent land uses on water quality and to provide habitat for aquatic and semi-aquatic species. They play a vital role in protecting aquatic resources and mitigating anthropogenic impacts.

The proposed buffer zones in the study area are designed to offer a wide range of functions and values, including sediment, nutrient, and toxic removal, control of microclimate and water temperature, provision of habitat for wildlife, screening of disturbances, habitat connectivity, channel stability, flood attenuation, groundwater recharge, and aesthetic appeal. However, it's important to note that buffer zones cannot address all water resource-related problems. They may not be effective in mitigating certain impacts like changes in flow caused by abstractions or point-source discharges, such as sewage outflows.

Given the existing anthropogenic impacts in and around the watercourses, along with the forthcoming development, an aquatic buffer is deemed essential to maintain watercourse integrity. However, it's important to acknowledge that a 20-30m aquatic surface buffer might not fully protect catchment-related hydrology, such as groundwater recharge. Therefore, mitigation and management measures for the proposed development in the larger catchment should also be considered to compensate for potential losses.

The recommended buffer distances are based on the delineation of aquatic impact buffer zones, beginning from the outer edge of the active channel. These buffer zones may encompass riparian habitats, stream banks, and terrestrial habitats, depending on their width. The calculated buffer distances vary for different watercourses, taking into account the presence of riparian fringes:

- Intermittent streams with less no to narrow riparian fringes:
  - Aquatic Buffer for Electrical Grid Infrastructure: 25 m;
- Narrow drainage lines without riparian fringes:
  - Aquatic Buffer for Solar PV Facility: 40 m.

WC 2 and its associated 40m aquatic buffer is located outside of the development footprint. This watercourse as well its buffer area should be regarded as a No-Go Zone apart from the use of the existing access road. It is highly unlikely that the proposed development, with the maintenance of the buffer area, will significantly impact WC 2.

WC 1 is located within the grid corridor. WC 1 and the proposed 25 m aquatic buffer should be spanned, and no pylons may be allowed within the buffer area. Apart from the spanning of WC 2 the only other activities allowed within this watercourse are the upgrade of existing access routes/watercourse crossings and where no acceptable crossings are available the construction of a new crossing may be allowed, with the implementation of strict mitigation and monitoring measures.

This approach ensures that management efforts are aligned with the ecological condition of each watercourse, promoting conservation and sustainable use of these vital aquatic habitats within the project area.

With mitigation measures in place, impacts on surface water resource integrity and functioning can be reduced to a sufficiently low level. This would be best achieved by incorporating the recommended management & mitigation measures into an Environmental Management Programme (EMPr) for the site, together with appropriate rehabilitation guidelines and ecological monitoring recommendations.

Based on the outcomes of this study it is the specialist's considered opinion that the proposed project detailed in the Aquatic Report could be authorised from a surface water resource perspective.

TERRESTRIAL BIODIVERSITY

The affected properties are primarily utilized for game and cattle ranching, with minimal infrastructure. Historically, livestock farming was predominant, resulting in overgrazing and soil degradation, leading to encroachment by thorny bushes.

A very small portion of the project site (along the eastern boundary of the project site) falls within a NPAES Focus Area (0.086 ha or 0.03% of project site). In terms of this small area being classified as a NPAES Focus Area, this is rather due to an error that occurred during the processing of the spatial data used to generate the Focus Area map. This Focus Area is associated with the adjacent property to the east but has slightly extended to areas outside of this property.

A very small portion (0.08 ha) of the project site (along the eastern boundary of the project site) falls within this CBA2 Corridor. In terms of this small area being classified as a CBA 2, this is rather due to an error that occurred during the processing of the spatial data used to generate the CBA map. This CBA 2 area is rather associated with the adjacent property to the east but has slightly extended to areas outside of this property and into the effected property.

From a botanical and ecological perspective, a total of eight (8) plant community types were identified.

Development within Very Low and Low sensitivity plant communities is regarded as acceptable. Development in these areas will not threaten their integrity, as well as the services and functions provided by them. Furthermore, impacts on the areas listed as Medium Site Ecological Importance can be mitigated to acceptable levels, or these areas can be avoided since they occupy only a very small area of the proposed development site. No plant SoCC were recorded within the proposed development site.

A total of 178 plant species were found within the proposed development site, which consisted of 158 native, 0 SCC, 3 protected, 20 alien, and 7 NEM:BA listed invasive species. Protected plant species were found in 5 of the plant community types. Care must be taken to avoid any protected plant species, should they be found. It is recommended that a pre-construction walkthrough be undertaken by a qualified botanist prior to commencement of construction. It must be noted that a permit must be obtained from relevant local competent authorities to damage, destroy, or relocate any SCC or protected plant species; any such actions are considered illegal without a permit, in which case such species must be avoided completely.

From a fauna species and habitat perspective, a total of four (4) major faunal habitat types were identified namely:

- Savanna Shrubland occupying deep sandy-loam soils plains (seriously modified): Very Low Sensitivity;
- Savanna Grassland occupying sandy-loam plains (critically to seriously modified): Very Low Sensitivity;
- Tree Savanna occupying deep to moderately deep sandy-loam plains (mainly moderately modified with some areas being largely modified and small patches still in a near-natural condition): Low Sensitivity; and
- Pasture or Pure Grassland occupying deep sandy-loam plains soils (completely modified): Very Low Sensitivity.

Mammal diversity within the PAOI was considered low. A total of 16 mammal species were observed within the PAOI. However, 6 of these species are larger antelope (Family: Cetartiodactyla) species that has been introduced into the area for "agricultural purposes" (intensive game breeding). These species are predominantly larger and scarcer antelope species as well as exotic variation of these antelope species. Furthermore, these species are kept in fairly small grazing camps which is surrounded by tall, impenetrable game fences, restricting any natural movement in and out of these areas (larger mammals). During the site visit no mammal SCC were recorded within the PAOI.

A very low herpetofaunal diversity was observed during the field assessment, with only five (5) reptile species observed and no amphibian species. Reptile diversity and abundance are anticipated to fairly low to a low habitat and niche diversity and general structural complexity within the project site. The general arid landscape does not lend itself to habitation by amphibians. During the site visit no Reptile or Amphibian SCC were recorded through active searching (diurnal and nocturnal surveys), and through random observations.

There are no impacts associated with the proposed Boshoek Solar PV 1 development that cannot be mitigated to a low level. Its local environmental impact can be reduced to an acceptable magnitude. Likewise, the contribution of the proposed Solar PV facility to the cumulative impact in the area would be low and is acceptable. As such, there are no fatal flaws associated with the development and no terrestrial ecological considerations that should prevent it from proceeding. Therefore, it is the opinion of the specialists that the development may be authorised within the specified area, subject to the implementation of the recommended mitigation measures.

AVIFAUNA

The Site Ecological Importance (SEI) of the proposed Project Area of Influence (PAOI) was found to be low to medium but predominantly medium. However, the sensitivity can be assumed to be low. Impacts were identified as being High to Medium in the Construction Phase, most of which could be reduced to Medium or Low with mitigation measures described in the report. Impacts in the operational phase are expected to be Medium and can be reduced to Medium or Low with mitigation measures described in the report. Decommissioning phase impacts are expected to be Medium and can be reduced to Low with mitigation measures. Cumulative impacts are Low for the project in isolation and Medium in consideration with other similar projects.

Management measures include ensuring the construction footprint is kept small and industry-standard mitigations are put into place for solar panels, fencing and electrical infrastructure,

among other measures. All project aspects can be effectively mitigated to an acceptable residual impact in support of the renewable development project.

The proposed PV development already avoids sensitive areas. However, it is recommended that a final walkthrough be done prior to construction, and the purpose of the walkthrough would be for any additional mitigation measures.

HERITAGE, ARCHAEOLOGY AND PALEONTOLOGY

During the fieldwork no heritage resources were identified, however, not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area.

It is the combined considered opinion of the heritage specialists that the proposed project will not have a direct impact on heritage resources.

With the implementation of recommended mitigation measures the overall impact on heritage resources will be at an acceptable level during all phases of the project.

Based on desktop research it is determined that fossil heritage of scientific and conservational interest in the overall development footprint for the solar facilities is rare. This is in contrast with the High Sensitivity allocated to the development area by the South African Heritage Resources Information System (SAHRIS) Palaeosensitivity Map and DFFE Screening Tool.

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.

VISUAL/LANDSCAPE

The existing visual condition of the landscape that may be affected by the proposed Boshoek 1 Solar Park PV Project and associated Grid infrastructure has been described. The study area's scenic quality has been rated moderate to high within the context of the sub-region. Sensitive viewing areas have been identified and mapped, indicating potential moderate to high sensitivity to the Project, mainly for nearby tourist accommodation.

Impacts on views are the highest when viewers are sensitive to change in the landscape, and the view is focused on and dominated by the change. The Project's visual impact will cause changes in the landscape that are noticeable to people viewing the landscape from nearby farmsteads/game farms and along the east west arterial road and local farm roads. The potential impact ratings are based on the worst-case scenario and when the impacts of all aspects of the Project are taken together. It is anticipated that visual impacts could result from the activities and infrastructure in all the Project phases i.e., construction, operational, and decommissioning.

Construction activities include the removal of bushveld and grassland vegetation, earthworks required to create building terraces for substation and preparation of the internal roads, as well as excavations for the array structures foundations, and the erection of the PV arrays and associated infrastructure. Construction activities would negatively affect the landscape's visual quality and sense of place relative to its baseline as they would contrast with the patterns that currently define the structure of the landscape. However, the greatest impact would be on the site itself.

The worst-case impact on the visual environment during the construction phase is assessed to have a low severity over a localized area (but extend beyond the site boundary) and would occur over the short-term (less than the life of the project). The probability of the unmitigated impact is medium, resulting in a predicted medium significance of negative impact. The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain medium.

Operational activities include the regular cleaning of the PV modules, vegetation management under and around the PV modules and maintenance of all other infrastructural components. Security lighting and other lighting associated with the movement of security vehicles at night. These activities along with the physical presence of the Project components day and night, constitute the visual impact.

The worst-case impact on the visual environment during the operational phase is assessed to have a medium severity over a localized area (but extend beyond the site boundary) and would occur over the long-term (anticipated to be thirty years). The probability of the unmitigated impact is medium resulting in a moderate predicted significance negative impact. Mitigation measures are feasible and can reduce the visual impact over time (once the proposed tree screens are established, where required). The impact with mitigation is predicted to be low.

Decommissioning and closure activities include the dismantling and removal of infrastructure and the rehabilitation of the site back to its current, mostly natural, state.

The worst-case impact on the visual environment during the decommissioning phase is assessed to have a moderate intensity over a localized area (but extend beyond the site boundary) and would occur over the short-term (less than the life of the project). The probability of the unmitigated impact is medium, resulting in a predicted LOW significance of negative impact. The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain low.

The consequences associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels, provided the recommended measures are effectively implemented and managed in the long term.

SOCIO-ECONOMIC

Boshoek Solar 1 SEF has the potential to result in significant positive impacts, specifically as the project has the potential to create socio-economic opportunities for the region, which in turn, can result in positive social benefits.

The positive impacts identified at this stage in the process include the creation of employment, skills development and training opportunities, and downstream business opportunities. The further potential of the project benefits to the local and regional economy through employment and procurement of services is more considerable than that of the Boshoek Solar 1 Energy Facility alone.

Similarly, several possible negative social impacts which may affect the socio-economic baseline of the area have been identified. Concerns over safety and security in the area, nuisance impacts, and visual impact and impacts on the sense of place could cause harm in the area.

From a social perspective, it is concluded that the proposed project and associated infrastructure are acceptable and should be developed subject to the implementation of the recommended mitigation measures and management actions.

TRAFFIC AND TRANSPORTATION

A Traffic Impact Assessment and a Traffic Management Plan are required to address possible issues on the R565 in Boshoek at the OK Grocer shopping hub, and on-site pedestrian safety. A few abnormal load vehicles transporting heavy machinery will operate under permit obtained by the transport carrier. The R565/D114 intersection requires road markings and signage to improve readability by motorists and to avoid unnecessary crashes.

Taking the above findings into consideration it can be concluded that the development of the Boshoek Solar PV 1 facility and associated infrastructure should not have undue detrimental impact on traffic and that identified impacts can be suitable mitigated.

It is the reasoned opinion of the specialist that the development of the Boshoek SEF 1 facility can be approved, from a traffic and transport engineering perspective, subject to the specific requirements/mitigation measures.

SPECIALIST IMPACT TABLE SUMMARY

CONSTRUCTION PHASE IMPACTS

Construction Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Freshwater and Wetlands								
Impact on freshwater resource systems through the increase in surface runoff on form and function	Without Mitigation	Medium	Medium	Medium	Negative	High	Medium	High
	With Mitigation	Low	Medium	Low	Neutral	Medium	Medium	High
Increase in sedimentation and erosion	Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	High
	With Mitigation	Low	Low	Low	Negative	Low	Low	High
Potential impact on localised surface water quality	Without Mitigation	Medium	Medium	Low	Negative	Low	Low	High
	With Mitigation	Low	Low	Low	Negative	Low	Low	High
Loss of freshwater resource features during the construction	Without Mitigation	High	Medium	Medium	Negative	High	Medium	High
	With Mitigation	Low	Medium	Low	Negative	Low	Low	High
Terrestrial Biodiversity								
Potential impacts on plant biodiversity and habitats	Without Mitigation	Medium	Low	High	Negative	High	Medium	High
	With Mitigation	Medium	Low	Medium	Negative	Medium	Medium	High
Impact on Faunal Diversity	Without Mitigation	Low	Low	Medium	Negative	High	Medium	High

Construction Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
	With Mitigation	Low	Low	Medium	Negative	Medium	Medium	High
Potential impacts on Animal Species of Conservation Concern (SoCC)	Without Mitigation	High	Low	High	Negative	Low	Medium	High
	With Mitigation	High	Low	Medium	Negative	Low	Low	High
Soil erosion and associated degradation of ecosystems	Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
	With Mitigation	Low	Low	Low	Negative	Medium	Medium	High
Avifauna								
Destruction, further loss and fragmentation of the habitats, ecosystems and vegetation community, including protected species	Without Mitigation	Medium	Medium	Medium	Negative	Medium	High	Medium
	With Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
Spread and/or establishment of alien and/or invasive species	Without Mitigation	Medium	Medium	Medium	Negative	Medium	High	Medium
	With Mitigation	Low	Medium	Medium	Negative	Medium	Medium	Medium
Displacement of avifaunal community due to habitat loss, direct mortalities and disturbance	Without Mitigation	Medium	Medium	Medium	Negative	Medium	High	Medium
	With Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
Dust generation from construction activities	Without Mitigation	Low	Medium	Medium	Negative	Low	Low	Medium
	With Mitigation	Low	Low	Low	Negative	Low	Low	Low
Heritage and Paleontology								

Construction Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Impact on Fossil Heritage	Without Mitigation	Medium	Low	High	Negative	High	Low	High
	With Mitigation	Medium	Low	High	Neutral	Low	Low	High
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Visual/Landscape								
Change of the landscape characteristics and key views i.e. visual intrusion	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
	With Mitigation	Medium	Medium	Low	Negative	Medium	Medim	Medium
Socio-economic								
Employment opportunities and skills development	Without Mitigation	Low	Medium	Low	Positive	Medium	Low	Medium
	With Mitigation	Medium	Medium	Low	Positive	Medium	Medium	Medium
Multiplier effects on the local economy	Without Mitigation	Low	Medium	Low	Positive	Medium	Low	Medium
	With Mitigation	Medium	Medium	Low	Positive	Medium	Medium	Medium
	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium

Construction Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Influx of Jobseekers and change of population	*With Mitigation*	Low	Medium	Low	Negative	Medium	Low	Medium
Safety and security	Without Mitigation	Medium	Medium	Low	Negative	Medium	Low	Medium
	With Mitigation	Low	Low	Low	Negative	Low	Low	Medium
Increased pressure on local services/resources	Without Mitigation	Medium	Medium	Low	Negative	Medium	Low	Medium
	With Mitigation	Low	Low	Low	Negative	Low	Low	Medium
Disruption of daily living and movement patterns	Without Mitigation	Medium	Medium	Low	Negative	High	Low	Medium
	With Mitigation	Low	Low	Low	Negative	Medium	Low	High
Nuisance impacts (noise & dust)	Without Mitigation	Medium	Medium	Low	Negative	High	Low	Medium
	With Mitigation	Low	Low	Low	Negative	Medium	Low	High
Impacts associated with the loss of agricultural land	Without Mitigation	Medium	Medium	Low	Negative	High	Low	Medium
	With Mitigation	Low	Low	Low	Negative	Medium	Low	High
Traffic and Transportation								
Traffic congestion	Without Mitigation	Medium	Medium	Low	Negative	High	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Medium	Medium	Medium
	Without Mitigation	High	Medium	Low	Negative	High	Medium	High

Construction Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Road safety at DR114/R565 intersection	*With Mitigation*	High	Medium	Low	Positive	Low	Low	High
Road safety at DR114/Site access road intersection	Without Mitigation	High	Medium	Low	Negative	Medium	Medium	Medium
	With Mitigation	High	Medium	Low	Negative	Low	Low	Medium
Road safety at site access	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium
Degradation of gravel site access road	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	High
	With Mitigation	Medium	Medium	Low	Negative	Low	Low	High
Dust on gravel site access road	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	High
	With Mitigation	Medium	Medium	Low	Negative	Low	Low	High
Pedestrian safety on-site	Without Mitigation	High	Low	Low	Negative	High	Medium	Medium
	With Mitigation	High	Low	Low	Negative	Low	Low	High

OPERATIONS PHASE IMPACTS

Operational Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Freshwater and Wetlands								
Impact on freshwater resource systems through the increase in surface runoff on form and function	Without Mitigation	Medium	Medium	Medium	Negative	High	Medium	High
	With Mitigation	Low	Medium	Low	Neutral	Medium	Medium	High
Increase in sedimentation and erosion	Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	High
	With Mitigation	Low	Low	Low	Negative	Low	Low	High
Terrestrial Biodiversity								
Alien Plant Invasion	Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
	With Mitigation	Low	Low	Low	Negative	Medium	Medium	High
Direct Faunal Impacts	Without Mitigation	Low	Low	Medium	Negative	Medium	Medium	High
	With Mitigation	Low	Low	Low	Negative	Low	Low	High
Soil erosion and associated degradation of ecosystems	Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
	With Mitigation	Low	Low	Low	Negative	Low	Low	High
Alien Plant Invasion	Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
	With Mitigation	Low	Low	Low	Negative	Low	Low	High

Operational Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Avifauna								
Continued fragmentation and degradation of habitats and ecosystems	Without Mitigation	Medium	Medium	Medium	Negative	Medium	High	Medium
	With Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
Spread of alien and/or invasive species	Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
	With Mitigation	Low	Low	Low	Negative	Low	Low	Low
Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance	Without Mitigation	High	Medium	Medium	Negative	Medium	Medium	Medium
	With Mitigation	Medium	Low	Low	Negative	Low	Low	Low
Heritage and Paleontology								
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Impact on Fossil Heritage	Without Mitigation	Medium	Low	High	Negative	High	Low	High
	With Mitigation	Medium	Low	High	Neutral	Low	Low	High
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Visual/Landscape								

Operational Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Visual Impact	Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium
Socio-economic								
Direct Employment and skills development during operation	Without Mitigation	Low	Medium	High	Positive	Medium	Low	Medium
	With Mitigation	Medium	Medium	High	Positive	High	Low	High
Development of clean, renewable energy infrastructure	Without Mitigation	Medium	Medium	High	Positive	High	Low	High
	With Mitigation	Medium	Medium	High	Positive	High	Low	High
Visual impacts and impacts on sense of place	Without Mitigation	Medium	Medium	High	Negative	High	Medium	Medium
	With Mitigation	Low	Low	High	Negative	Medium	Low	High
Benefits associated with socio-economic contributions	Without Mitigation	Medium	Medium	High	Positive	High	Low	High
	With Mitigation	Medium	Medium	High	Positive	High	Low	High
Impacts associated with the loss of agricultural land	Without Mitigation	Medium	Medium	High	Negative	High	Low	Medium
	With Mitigation	Low	Low	High	Negative	Medium	Low	High
Traffic and Transportation								
Road safety at site access	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium

Operational Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
	With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium

DECOMMISSIONING PHASE IMPACTS

Decommissioning Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Freshwater and Wetlands								
Compromise ecological processes as well as ecological functioning of important freshwater resource habitats	Without Mitigation	Medium	Medium	High	Negative	High	High	High
	With Mitigation	Low	Medium	Medium	Negative	Low	Low	High
Heritage and Paleontology								
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Impact on Fossil Heritage	Without Mitigation	Medium	Low	High	Negative	High	Low	High
	With Mitigation	Medium	Low	High	Neutral	Low	Low	High
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Visual/Landscape								

Decommissioning Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Visual Impact	Without Mitigation	Low	Medium	Low	Negative	Low	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Low	Medim	Medium
Traffic and Transportation								
Road safety at site access	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium
Degradation of gravel site access road	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
	With Mitigation	Medium	Medium	Low	Negative	Low	Low	Medium
Dust on gravel site access road	Without Mitigation	High	Low	Low	Negative	Medium	Medium	Medium
	With Mitigation	Low	Low	Low	Negative	Low	Low	Medium
Pedestrian safety on site	Without Mitigation	High	Low	Low	Negative	Medium	Medium	Medium
	With Mitigation	Medium	Low	Low	Negative	Low	Low	Medium

CUMULATIVE PHASE IMPACTS

Cumulative Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Freshwater and Wetlands								
Compromise ecological processes as well as ecological functioning of important freshwater resource habitats	Without Mitigation	Medium	Medium	High	Negative	High	High	High
	With Mitigation	Low	Medium	Medium	Negative	Low	Low	High
Terrestrial Biodiversity								
Impact on Critical Biodiversity Areas and broad-scale ecological processes	Without Mitigation	Low	High	Medium	Negative	Low	Low	High
	With Mitigation	Low	High	Medium	Negative	Low	Low	High
Impact on Critical Biodiversity Areas and broad-scale ecological processes	Without Mitigation	Low	High	Medium	Negative	Low	Low	High
	With Mitigation	Low	High	Medium	Negative	Low	Low	High
Avifauna								
PV cluster development, leading to habitat loss, collisions and electrocutions	Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
	With Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
Heritage and Paleontology								
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High

Cumulative Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Impact on Fossil Heritage	Without Mitigation	Medium	Low	High	Negative	High	Low	High
	With Mitigation	Medium	Low	High	Neutral	Low	Low	High
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Visual/Landscape								
Change of the landscape characteristics and key views and potential glint and glare	Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Low	Low	Low
Socio-Economic								
An increase in employment opportunities, skills development, and business opportunities with the establishment of more than one solar energy facility	Without Mitigation	Medium	Medium	High	Positive	Medium	Low	Medium
	With Mitigation	Medium	Medium	High	Positive	High	Medium	High
An increase in security and safety risks resulting from the influx of job seekers and road activity associated with the construction and operations of similar facilities	Without Mitigation	Medium	Medium	High	Negative	High	Medium	Medium
	With Mitigation	Low	Low	High	Negative	Medium	Low	High

Cumulative Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Traffic and Transportation								
Traffic congestion	Without Mitigation	High	Medium	Low	Negative	High	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium

DFFE: INFORMATION REQUIREMENTS FOR SOLAR PV APPLICATIONS

The DFFE's requirements in terms of information for all applications for SEFs are included in this section of the report. Where this information is not provided in the tables below, the location of where it can be found in the report is indicated.

TABLE 0-1 DETAILS OF THE AFFECTED FARM PROPERTIES AND SG 21 CODES

Farm Name	Portion No.	Farm No.	SG 21 Codes
Farm Rhenosterdoorns	0	531	TOJP00000000053100000
Farm Zwaarverdiend	1	234	TOJP00000000023400001
Farm Zwaarverdiend	18	234	TOJP00000000023400018
Farm Paul Bodenstein Landgoed	Remaining Extent	571	TOJQ00000000057100000
Farm Elandsfontein	1	102	TOJQ00000000010200001
Farm Onderstepoort	Remaining Extent	98	TOJQ00000000009800000

TABLE 0-2 GENERAL SITE INFORMATION

Component	Description/Dimensions
Copies of deeds of all affected farm portions	Submitted with the Application Form to the DFFE.
Location of the site	Boshoek Solar 1 SEF is located approximately 33 km northwest of Rustenburg within the Kgetlengrivier and Rustenberg Local Municipalities, and the Bojanala District Municipality, North West Province.
Facility Area	Approximately 290 hectares. This is the permanent development footprint.
Photos of areas that give a visual perspective of all parts of the site	Refer to the Visual Scoping Report (Volume II).
Photographs from sensitive visual receptors (tourism routes, tourism facilities, etc.)	Refer to the Visual Scoping Report (Volume II).

TABLE 0-3 SEF TECHNICAL DETAILS

Component	Description/Dimensions
Maximum Generation Capacity	Up to 150 MW
Type of technology	Onshore Solar
Operations and maintenance buildings (O&M building) with parking area	An area of up to 1 ha will be occupied by buildings, which will include (but not limited to) a 33 kV switch room, a gate house, ablutions, workshops, storage and warehousing areas, site offices and a control center.
Site Access	Access to site will be directly off existing unnamed gravel roads in the nearby vicinity.
Capacity of on-site substation	Up to 132 kV
Battery Energy Storage System footprint	Up to 5 ha
Length of internal roads	Up to 33 km
Width of internal roads	up to 6 m
Proximity to grid connection	~ 3.5 km
Internal Cabling	Medium voltage cables (up to 33 kV)
Height of fencing	Up to 3.5 m
Type of fencing	Where site offices are required, temporary screen fencing used to screen offices from the wider landscape.

TABLE 0-4 SITE MAP AND GIS INFORMATION

Site Maps and GIS Information	Report Reference
All maps/information layers are provided in ESRI Shapefile format.	
All affected farm portions must be indicated.	Figure 1: Site Locality Map
The exact site of the application must be indicated (the areas that will be occupied by the application).	Figure 1: Site Locality Map
A *status quo* map/layer must be provided that includes the following: Current use of land on the site including:	
Buildings and other structures	Figure 2: Site Development Plan
Agricultural fields	Figure 4: Important Ecological Areas Map
Grazing areas	Figure 4: Important Ecological Areas Map
Natural vegetation areas (natural veld not cultivated for the preceding 10 years) with an indication of the vegetation quality as well as fine scale mapping in respect of Critical Biodiversity Areas and Ecological Support Areas	Figure 4: Important Ecological Areas Map
Critically endangered and endangered vegetation areas that occur on the site	Figure 5: Sensitivity Map
Bare areas which may be susceptible to soil erosion	Figure 4: Important Ecological Areas Map
Cultural historical sites and elements	No cultural historical sites and elements have been identified by the specialist.
Rivers, streams and water courses	Figure 5: Sensitivity Map
Fountains, boreholes, dams (in-stream as well as off-stream) and reservoirs	Figure 4: Important Ecological Areas
High potential agricultural areas as defined by the Department of Agriculture, Forestry and Fisheries	No high potential agricultural areas have been identified by the specialist.
Indicate isolated residential, tourism facilities on or within 1 km of the site	Figure5: Sensitivity Map
A map/layer that indicate locations of birds and bats including roosting and foraging areas	Figure 5: Sensitivity Map
A site development proposal map(s)/layer(s) that indicate: PV Panels positions Foundation footprint Permanent laydown area footprint Construction period laydown footprint Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible).	Figure 2: Site Development Plan

Site Maps and GIS Information	Report Reference
River, stream and water crossing of roads and cables indicating the type of bridging structures that will be used.	Figure 4: Important Ecological Areas

TABLE 0-5 DEVELOPMENT AREA GEOGRAPHIC COORDINATES – BOSHOEK 1 SEF

Proposed Boshoek 1 SEF Site Boundary and Associated Infrastructure		
Aspect	Latitude	Longitude
Centre Point	25° 28’ 26.74”	26° 59’ 24.39”
North West corner	25° 27’ 49.54”	26° 58’ 55.96”
North East corner	25° 27’ 49.65”	26° 59’ 45.11”
South East corner	25° 28’ 31.56”	26° 0’ 9.48”
South West corner	25° 29’ 12.11”	26° 59’ 15.22”
Proposed Boshoek 1 SEF BESS Co-ordinates		
North East Corner	25°27'49.14"S	26°59'41.68"E
North South Corner	25°27'57.43"S	26°59'41.72"E
South West Corner	25°27'57.53"S	26°59'34.80"E
North West Corner	25°27'48.88"S	26°59'34.73"E
Proposed Boshoek 1 SEF Powerline Route Co-ordinates		
Reference 1	25°27'51.63"S	26°59'44.91"E
Reference 2	25°28'2.09"S	27° 0'51.30"E
Reference 3	25°27'47.43"S	27° 0'57.12"E
Reference 4	25°27'27.00"S	27° 1'15.95"E
Reference 5	25°27'21.73"S	27° 1'22.28"E
Proposed Boshoek 1 SEF Laydown Area Co-ordinates		
North East Corner	25°27'50.78"S	26°59'34.57"E
North South Corner	25°27'57.70"S	26°59'34.66"E
South West Corner	25°27'57.30"S	26°59'27.68"E
North West Corner	25°27'50.85"S	26°59'27.75"E

1. INTRODUCTION

1.1 PROJECT OVERVIEW

Boshoek Solar 1 (Pty) Ltd ('the Project Applicant') is applying for environmental authorisation (EA) to construct and operate the up to 150 MW Boshoek Solar 1 Solar Energy Facility (SEF) and its associated Grid Connection Infrastructure (hereafter referred to as the proposed Boshoek Solar 1 / the 'proposed development').

The proposed development is located approximately 12 km west of the town of Boshoek within the Kgetlengrivier and Rustenburg Municipalities in the North West Province.

In terms of Chapter 5 of the National Environmental Management Act, 1998 (Act 107 of 1998 – NEMA), and the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), the Project Applicant appointed Environmental Resources Management Southern Africa (Pty) Ltd (ERM), to act as the project manager and to undertake the Scoping and Environmental Impact Assessment (S&EIA) process for Environmental Authorisation.

1.2 PURPOSE AND AIM OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The National Environment Management Act, 1998 (Act No 107 of 1998) (NEMA) promotes the use of scoping and EIA to ensure the integrated environmental management of activities.

Section 24(1) of 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 authorisation."

EIA is ultimately a decision-making process with the specific aim of selecting an option that will provide the most benefit and cause the least impact. The EIA process should identify activities which may have a detrimental effect on the environment, and which would therefore require EA prior to commencement.

1.3 DFFE COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 1-1 below summaries the comments received from the DFFE on the Draft EIA Report. This table further indicates where in this report the comments have been addressed.

TABLE 1-1 COMMENTS RECEIVED FROM THE DFFE ON THE DRAFT EIA REPORT

No.	Comment from DFFE	EAP Response	Section in Report
DFFE Reference: 14/12/16/3/3/2/2508 Enquiries: Trisha Pillay **COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED 150MW BOSHOEK SOLAR 1 PV FACILITY AND ITS ASSOCIATED INFRASTRUCTURE, INCLUDING A GRID CONNECTION LOCATED IN THE KGETLENGRIVIER LOCAL MUNICIPALITY AND THE RUSTENBURG LOCAL MUNICIPALITY WITHIN THE BOJANALA DISTRICT MUNICIPALITY IN THE NORTH WEST PROVINCE**			
The Application for Environmental Authorisation and the draft Environmental Impact Assessment Report (EIAr) received by the Department on 27 February 2024 and 03 July 2024, respectively, refer. <u>This letter serves to inform you that the following information must be included in the final EIAr:</u>			
(a) Specific Comments			
i.	The co-ordinates in the EIAr must be specific to each activity and infrastructure that is proposed on the site. The co-ordinates for each corner of the solar field, the substation, BESS, powerline route, and laydown areas must be included in the EIAr, i.e., we require that you provide us with the specific development footprints for each development parameter, and not an area outlining the entire site.	The Development Area Geographic Coordinates has been included in the Description of the Baseline Environment of the final EIAr.	Refer to Section 6.1of the final EIAr
ii.	Please provide a concise, but complete, summary and bullet list of the project description and associated infrastructure (or project scope) to be included in the decision (or as it should appear in the decision), should a positive Environmental Authorisation be granted. This must include a list of all development components and associated infrastructure.	A complete Site Location and Proposed Development Description has been included in the final EIAr.	Refer to the Site Location and Proposed Development Description of the final EIAr.
iii.	Kindly ensure the development footprints (hectares/square metres) and specifications of all proposed infrastructure and associated infrastructure during all phases are included in the EIAr.	The SEF Technical Details has been included in the Summary of Project Information of the final EIAr.	Refer to Section 8 of the final EIAr. Table 8-1.
iv.	The final EIAr must clearly provide a detailed section which addresses the site sensitivity verification requirements where a specialist assessment is required but no specific assessment protocol has been prescribed, as well	The Site Sensitivity Verification has been included in Section 4 of the final EIAr.	Refer to Section 4 Table 4-1of the final EIAr.

No.	Comment from DFFE	EAP Response	Section in Report
	as the site sensitivity verification and minimum report content requirements for all specialist assessments undertaken, which was included in the screening tool report. Kindly take note that this should be in the form of a report and should either confirm or dispute the sensitivity ratings for each theme identified by the screening tool report. Please refer to 1. Site sensitivity verification and minimum report content requirements of the Protocol document		
v.	A motivation must be provided in the final EIAr as to why particular studies that were identified in the screening tool were not undertaken.	All motivations for exclusion of studies are contained in the final EIAr and all exclusions relate to low sensitivity ratings from the screening tool.	Refer to Section 4 Table 4-1of the final EIAr.
vi.	Comments must be obtained from this Department's Biodiversity Conservation Directorate at BCAdmin@dffe.gov.za.	The Department's Biodiversity Conservation Directorate comment had been incorporated into the Final EIAr.	Volume III: PP Report
vii.	Please take note the DFFE templates for the Specialist declaration form for the assessments undertaken for application for authorisation must be used when submitting the final EIAr. This new template can be accessed on the DFFE website: https://www.dffe.gov.za/documents/forms/legal	The comment is noted that the Department's Specialist declaration form is available via download from the provided link. The most up to date application form downloaded from the department's website was used for this project.	Volume II: Specialist EIA Reports
viii.	Kindly note the EAP failed to submit the Generic EMPrs for the powerline and substation. According to GNR 435, Generic EMPrs must be submitted for powerlines and substations. Please take note that all the sections of the Generic EMPr should be correctly filled. Ensure that Part B: Section 2 of the EMPr is completed and signed by the applicant, and Part C: Site specific environmental attributes is completed. Please take note failure to submit all the required information that forms part of the Generic EMPr will be regarded as non-compliance. We request that you adequality complete all applicable sections in the Generic EMPr.	A generic Environmental Management Programme (EMPr) for the proposed powerline and substation has been included as Appendix B.	Annexure B: Environmental Management Programme
ix.	You are further reminded that the final EIAr to be submitted to this Department must comply with all the requirements in terms of the scope of assessment and content of the EIAr in accordance with Appendix 3 of the EIA Regulations, 2014 as amended	The EAP acknowledges this comment and does meet these requirements	n/a
(b)	**Listed Activities**		

No.	Comment from DFFE	EAP Response	Section in Report
i.	Please ensure that all relevant listed activities are applied for, are specific and that it can be linked to the development activity or infrastructure as described in the project description.	All relevant listed activities have been identified and applied for. The specific aspect of the project activities associated with each Listed Activity is detailed in the application and in the final EIAr Report.	Refer to the final EIAr and Section 2 – Table 2-1of the final EIA Report.
ii.	If the activities applied for in the application form differ from those mentioned in the final EIAr, an amended application form must be submitted. Please note that the Department's application form template has been amended and can be downloaded from the following link https://www.environment.gov.za/documents/forms.	The listed activities represented in the final EIAr do not differ from those in the application form, which has been included in the final EIAr.	Refer to the final EIAr and Section 2 – Table 2-1of the final EIA Report.
iii.	It is imperative that the relevant authorities are continuously involved throughout the environmental impact assessment process as the development property possibly falls within geographically designated areas in terms of numerous GN R. 985 Activities. Written comments must be obtained from the relevant authorities and submitted to this Department. In addition, a graphical representation of the proposed development within the respective geographical areas must be provided	Comment was received from the relevant authorities and were continuously involved throughout the environmental impact assessment process.	n/a
(c)	**Layout & Sensitivity Maps**		
i.	The final EIAr must provide coordinate points for the proposed development site (note that if the site has numerous bend points, at each bend point coordinates must be provided) as well as the start, middle and end point of all linear activities.	The Development Area Geographic Coordinates has been included in the Description of the Baseline Environment of the final EIAr.	Refer to Section 6, Table 6-2 of the final EIAr.
ii.	The EIAr must provide a copy of the final preferred layout map. All available biodiversity information must be used in the finalisation of the layout map. Existing infrastructure must be used as far as possible e.g., roads. The layout map must indicate the following: a) A clear indication of the envisioned area for the proposed solar fields; b) Internal roads; c) All supporting onsite infrastructure such as laydown area, guard house and control room etc. (existing and proposed);	A layout map detailing the proposed layout of the facility (including all infrastructure) and the identified environmental sensitives and recommended buffers has been included as Figures in the Appendices of the final EIAr. The optimised layout (including all infrastructure) and the identified environmental sensitives and recommended buffers is included as Figures Appendices of the final EIAr.	Refer to the Figure 1 in Appendix A of the final EIAr.

No.	Comment from DFFE	EAP Response	Section in Report
	d) Substations, transformers, switching stations and inverters; e) Battery Energy Storage System; f) Powerline route (including pylon positions) to the distribution/transmission network; g) All existing infrastructure on the site, especially railway lines and roads; and h) Buildings, including accommodation.		
iii.	Please provide an environmental sensitivity map which indicates the following: a) The location of sensitive environmental features identified on site, e.g. CBAs, protected areas, heritage sites, wetlands, drainage lines, nest and roosting sites, etc. that will be affected by the facility and its associated infrastructure; b) Buffer areas; and c) All "no-go" areas.	An Environmental Sensitivity map, which includes all features listed in this comment has been included in the final EIAr.	Refer to the Figures Appendix of the final EIA Report.
iv.	The above layout map must be superimposed (overlain) with the sensitivity map and a cumulative map which shows neighbouring and existing infrastructure.		
v.	Google maps will not be accepted.	The comment is noted and the EAP confirms that no maps have been generated on Google maps.	n/a
(d)	**Specialist Declaration of Interest**		
i.	Specialist Declaration of Interest forms must be attached to the final EIAr. You are therefore requested to submit original signed Specialist Declaration of Interest forms for each specialist study conducted. The forms are available on Department's website (please use the Department's template).	Please refer to Specialist Declarations Volume II: Specialist EIA Reports	Volume II: Specialist EIA Reports

No.	Comment from DFFE	EAP Response	Section in Report
(e)	**Specialist Assessments**		
i.	The EAP must ensure that the terms of reference for all the identified specialist studies must include the following: a) A detailed description of the study's methodology; indication of the locations and descriptions of the development footprint, and all other associated infrastructures that they have assessed and are recommending for authorisation. b) Provide a detailed description of all limitations to the studies. All specialist studies must be conducted in the right season and providing that as a limitation will not be allowed. c) Please note that the Department considers a 'no-go' area, as an area where no development of any infrastructure is allowed; therefore, no development of associated infrastructure including access roads is allowed in the 'no-go' areas. d) Should the specialist definition of 'no-go' area differ from the Department's definition; this must be clearly indicated. The specialist must also indicate the 'no-go' area's buffer if applicable. e) **All specialist studies must be final, and provide detailed/practical mitigation measures for the preferred alternative and recommendations, and must not recommend further studies to be completed post EA.** f) **Bird studies must have support from Birdlife South Africa.** g) Should a specialist recommend specific mitigation measures, these must be clearly indicated.	a) All specialist studies include a detailed description of the study's methodology; indication of the locations and descriptions of the development footprint and all other associated infrastructures. Refer to Volume II for all specialist reports. b) All specialist studies include assumptions and limitations and were conducted in the correct seasons. c) The definition of a 'no-go'area as defined by the department is noted. d) The specialist definition of 'no-go' areas does not differ from the Department's definition. e) All studies are final and mitigation measures are practical with no recommendations for post EA. f) The EAP acknowledges the support that Bird Specialists needs from Birdlife South Africa. The specialist study has been sent to Birdlife South Africa for comment. g) The mitigation measure recommended by the specialist in their individual reports have been compiled into the final EIAr under Section 10 assessment of Potential Impacts.	Refer to Section 4, 10 and Volume II of the final EIAr Follow up emails have been sent out to Birdlife for comment to be included, however no comment has been received prior to final EIA report submission
ii.	Should the appointed specialists specify contradicting recommendations, the EAP must clearly indicate the most reasonable recommendation and substantiate this with defendable reasons; and were necessary, include further expertise advice.	No contradicting recommendations have been made by the specialists.	n/a
iii.	It is further brought to your attention that Procedures for the Assessment and Minimum Criteria for Reporting in identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation, which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols") and in Government Notice No. 1150 of 30 October	The EAP is aware of the requirements of Section 24 (5) (a) and (h) and 44 of the National Environmental Management Act, 1998. Specialist assessments will be conducted in accordance with Government Notice No. 320 of 20 March 2020.	n/a

No.	Comment from DFFE	EAP Response	Section in Report
	2020 (i.e. protocols for terrestrial plant and animal species), have come into effect. **Please note that specialist assessments must be conducted in accordance with these protocols.**		
iv.	Please also ensure that the final EIAr includes the Site Verification Report and Compliance Statements (where applicable) as required by the relevant themes.	A Site Verification report has been compiled and included in the final EIAr. The Palaentology Site Sensitivity Verification is not included in the final EIR as no specific Environmental Theme Protocol has been prescribed (GG 43110 / GNR 320, 20 March 2020). The palaeontological sensitivity identified by the DFFE Screening Tool Report has been assessed and disputed by the specialist. Refer to Table 4 1.	Refer to Volume II of the final EIA Report.
v.	Please note further that the protocols, if applicable, require certain specialists' to be SACNASP registered. Please ensure that the relevant specialist certificates are attached to the relevant reports.	Specialist reports have been undertaken in terms of Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols"), and Government Notice No. 1150 of 30 October 2020 (i.e. protocols for terrestrial plant and animal species) proof of the SACNASP registration in the respective fields are appended to the assessment report.	Refer to Volume II of the final EIAr.
vi.	As such, the Specialist Declaration of Interest forms must also indicate the scientific organisation registration/member number and status of registration/membership for each specialist.	Signed copies of the Specialist Declaration of Interest forms (witnessed and signed by a Commissioner of Oaths) for all specialist studies conducted has been included for submission with the DEIR.	Refer to Volume II of the final EIAr.
(f)	**Cumulative Assessment**		
i.	Should there be any other similar projects within a 30km radius of the proposed development site, the cumulative impact assessment for all identified and assessed impacts must be refined to indicate the following: a) Identified cumulative impacts must be clearly defined, and where possible the size of the identified impact must be quantified and indicated, i.e. hectares of cumulatively transformed land. b) Detailed process flow and proof must be provided, to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project.	The similar projects within the 35km radius of the proposed development site are Boshoek 2 and 3 SEFs. Additionally, the latest REEA 2024 Q1 data indicate that two new SEF developments to the north and one new SEF development to the south are within 35km from the proposed Boshoek Solar 2 SEF. These projects were not initially considered at the time of study, as the data not available at the time. Additional potential cumulative impacts have been considered by the various specialists and amended in their respective specialist reports where necessary. The new REEA database has been released since the completion of the specialist assessments for the Boshoek solar energy facilities and additional	Refer to 4.3.3of the final EIAr.

No.	Comment from DFFE	EAP Response	Section in Report
	c) The cumulative impacts significance rating must also inform the need and desirability of the proposed development. d) A cumulative impact environmental statement on whether the proposed development must proceed.	projects had been amended and included in the cumulative impact assessment. a) Please refer to Section 11 of the final EIAr; b) Please refer to Section 11 of the final EIAr; c) Please refer to Section 5 Table 5-1 of the final EIAr; and d) Please refer to Section 13 of the final EIAr.	
(g)	**Undertaking of an Oath**		
i.	Please note that the final EIAr must have an undertaking under oath/ affirmation by the EAP	Please refer to EAP Oath of Completeness of EIAr in Appendix A	Refer to Appendix B of Volume I: Final EIAr
ii.	Based on the above, you are therefore required to include an undertaking under oath or affirmation by the EAP (administered by a Commissioner of Oaths) as per Appendix 3 of the NEMA EIA Regulations, 2014, as amended, which states that the EIAr must include: "an undertaking under oath or affirmation by the EAP in relation to: a) the correctness of the information provided in the reports; b) the inclusion of comments and inputs from stakeholders and I&APs; c) the inclusion of inputs and recommendations from the specialist reports where relevant; and d) 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".	Please refer to EAP Oath of Completeness of EIAr in Appendix A	Refer to Appendix B of Volume I: Final EIAr
(h)	**Details and Expertise of the EAP**		
i.	You are required to include the details and expertise of the EAP in the EIAr, including a curriculum vitae, in order to comply with the requirements of Appendix 3 of the NEMA EIA Regulations, 2014, as amended.	Please refer to EAP CV at Appendix B	Refer to Appendix B of Volume I: Final EIAr
(i)	**Public Participation**		

No.	Comment from DFFE	EAP Response	Section in Report
i.	The final EIAr must comply with all the conditions of the acceptance of the SR signed on 15 May 2024 and must address all comments contained in the final SR, the draft EIAr and this letter.	The final EIA report has addressed all comments received and is compliant with all conditions of the acceptance of the scoping report signed on 01 March 2023.	N/A
ii.	The Public Participation Process must be conducted in terms of Regulation 39, 40, 41, 42, 43 and 44 of the EIA Regulations, 2014, as amended.	The public participation process for the Boshoek 1 SEF has been conducted in terms of Regulation 39, 40 41, 42, 43 & 44 of the EIA Regulations 2014, as amended.	Refer to Section 9 of the final EIAr and Volume III – Public Participation Report.
iii.	Please ensure that comments from all relevant stakeholders are submitted to the Department with the EIAr. This includes but is not limited to the North West Department of Economic Development, Environment, Conservation and Tourism, the Bojanala District Municipality, the Kgetlengrivier Local Municipality, the Rustenburg Local Municipality, the South African Heritage Resources Agency (SAHRA), BirdLife SA, the Department of Mineral Resources and Energy, and the Department of Forestry, Fisheries and the Environment: Directorate Biodiversity and Conservation.	All issues raised and comments received during the availability of the DSR and DEIR have been addressed in the Public Participation Report (Volume III) and in the final EIAr, as required. Additionally, all the I&APs listed are, or have been added to the I&AP database.	Refer to the PP Report - Volume III.
iv.	Please ensure that all issues raised and comments received during the circulation of the draft SR and draft EIAr from registered Interested and Affected Parties (I&APs) and organs of state (including this Department's Biodiversity and Protected Area Sections), as listed in your I&APs Database, and others that have jurisdiction in respect of the proposed activity are adequately addressed and included in the final EIAr and are incorporated into a Comments and Response Report (CRR).	All issues raised and comments received during the availability of the DSR and DEIR have been addressed in the Public Participation Report (Volume III) and in the final EIAr, as required.	Refer to the PP Report - Volume III.
v.	Copies of original comments received from I&APs and organs of state, which have jurisdiction in respect of the proposed activity are submitted to the Department with the final EIAr	Please refer to Appendix E of Volume III PP Report. • Appendix E – Correspondence – Original Comments and Responses	Refer to the PP Report - Volume III.
vi.	Proof of correspondence with the various stakeholders must be included in the final EIAr. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments. In terms of Regulation 41(2)(b) of the EIA Regulations, 2014,	This has been provided for in the PP Report (Volume III) of the final EIAr. Any correspondence with relevant organs of state and stakeholders has been included in the comments and response table. Where no correspondence has been received, the proof of attempts to retrieve a comment has been provided.	Volume III: PP Report

No.	Comment from DFFE	EAP Response	Section in Report
	as amended, please provide proof of written notice for the availability of the EIAr for comment.		
vii.	The CRR report must be a separate document from the main report and the format must be in the table format as indicated in Annexure 1 of this comments letter.	Please refer to Comments and Response Report (CRR) in Volume III: PP Report.	Volume III: PP Report
viii.	Please refrain from summarising comments made by I&APs. All comments from I&APs must be copied verbatim and responded to clearly. Please note that a response such as "noted" is not regarded as an adequate response to I&AP's comments.	The comments and response report includes verbatim 'copy and paste' of comments received. Responses provided are adequate and addresses comments raised.	Volume III: PP Report
ix.	Minutes and attendance registers (where applicable) of any physical/virtual meetings held by the Environmental Assessment Practitioner (EAP) with Interested and Affected Parties (I&APs) and other role players must be included in the final EIAr	Please refer to CRR for minutes of Pre-application meeting, Appendix F – Pre-application.	Volume III: PP Report
(j)	**Environmental Management Programme**		
i.	The EIAr must include a final EMPr with measures, as dictated by the final site layout plan and micro-siting, and the recommendations of the EIAr. The EMPr must include the following: a) Alien invasive management plan b) Plant rescue and protection plan c) Re-vegetation and habitat rehabilitation plan d) Open space management plan e) Traffic management plan f) Transportation management plan g) Waste management plan h) Stormwater management plan i) Erosion management plan j) Fire management plan k) Avifauna management and monitoring plan l) Heritage management and monitoring plan	The content of the EMPr produced for the proposed development complies with the requirements included in Appendix 4 of the Environmental Impact Assessment Regulations, 2014, as amended, and includes, where relevant the plans and measures recommended by the Department. Volume 1: Appendix B – EMPr contains the following management/monitoring plans in the report: a) Section 10; b) Section 11; c) Section 12; d) Section 13; e) Section 14; f) Section 15;	Volume I: Appendix B: EMPr

No.	Comment from DFFE	EAP Response	Section in Report
	m) Visual management and monitoring plan n) A storm water and wash water management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. The plan must include the construction of design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water run-off o) An erosion management plan for monitoring and rehabilitating erosion events associated with the facility. Erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion. This plan must ensure to include drainage features that will be infilled and or excavated; p) All recommendations and mitigation measures recorded in the EIAr and the specialist reports as included in the EIAr; and, q) The final site layout plan. r) An environmental sensitivity map indicating environmental sensitive areas and features identified during the assessment process.	g) Section 16; h) Section 17; i) Section 18; j) Section 20; k) Section 21; l) Section 22; m) Section 23; n) Section 16 and 17; o) Section 18; p) EAP acknowledges request and has included it; q) Attached to EMPr Appendix as figure; and **r)** Attached to EMPr Appendix as figure.	
ii.	In addition to the above, the EMPr must comply with Appendix 4 of the EIA Regulations, 2014, as amended.		
iii.	It is drawn to your attention that for substation and overhead electricity transmission and distribution infrastructure, when such facilities trigger activity 11 or 47 of the Environmental Impact Assessment Regulations Listing Notice 1 of 2014, as amended, and any other listed and specified activities necessary for the realisation of such facilities, the generic Environmental Management Programme, contemplated in the Regulations must be used and submitted with the final report over and above the EMPr for the facility.	The generic EMPr for the substation and overhead electricity transmission and distribution infrastructure has been appended to the EMPr submitted with the final EIAr.	Volume I: Appendix B: EMPr
(h)	**General**		
	The EIAr must provide the technical details for the proposed facility in a table format as well as their description and/or dimensions. A sample of the minimum information required is listed under Annexure 2 of the EIA	Please refer to Section 8 – Summary of Project Information: • Table 8.1 – Summary of SEF Technical Details	Refer to Section 8 of the final EIAr

No.	Comment from DFFE	EAP Response	Section in Report
	information required for solar energy facility as requested in the acceptance of the SR. Please also ensure that the final EIAr includes the period for which the Environmental Authorisation is required and the date on which the activity will be concluded as per Appendix 3 of the NEMA EIA Regulations, 2014, as amended. You are further reminded to comply with Regulation 23(1)(a) of the NEMA EIA Regulations, 2014, as amended, which states that: *"The applicant must within 106 days of the acceptance of the scoping report submit to the competent authority –* *(a) an environmental impact assessment report inclusive of any specialist reports, an EMPr, a closure plan in the case of a closure activity and where the application is a mining application, the plans, report and calculations contemplated in the Financial Provisioning Regulations, which must have been subjected to a public participation process of at least 30 days and which reflects the incorporation of comments received, including any comments of the competent authority."* Should there be significant changes or new information that has been added to the EIAr or EMPr which changes or information was not contained in the reports or plans consulted on during the initial public participation process, you are required to comply with Regulation 23(1)(b) of the NEMA EIA Regulations, 2014, as amended, which states: *"The applicant must within 106 days of the acceptance of the scoping report submit to the competent authority – (b) a notification in writing that the documents contemplated in subregulation 1(a) will be submitted within 156 days of acceptance of the scoping report by the competent authority or where regulation 21(2) applies, within 156 days of receipt of the application by the competent authority, as significant changes have been made or significant new information has been added to the documents, which changes or information was not contained in the original documents consulted on during the initial public participation process contemplated in subregulation (1)(a), and that the revised documents contemplated in*	There have not been any significant changes or new information that have been added to the final EIAr or EMPr. The applicant has been made aware of the regulated timeframes as stipulated in Regulation 23(1)(a) of the NEMA EIA Regulations, 2014, as amended. Noted. There have been no significant changes or new information added to the final EIA report or EMPr. Therefore compliance with Regulation 23(1)(b) of the NEMA EIA Regulations, 2014, as amended is not applicable to the Boshoek 1 SEF.. The Applicant / EAP takes note of Section 24F of the National Environmental Management Act, Act No. 107 of 1998,.and confirms that no activity has / will commence without a positive environmental authorisation granted by the Department.	

No.	Comment from DFFE	EAP Response	Section in Report
	subregulation 1(a) will be subjected to another public participation process of at least 30 days". Should you fail to meet any of the timeframes stipulated in Regulation 23 of the NEMA EIA Regulations, 2014, as amended, your application will lapse. You are hereby reminded of Section 24F of the National Environmental Management Act, Act No. 107 of 1998, as amended, that no activity may commence prior to an Environmental Authorisation being granted by the Department.		

2. TERMS OF REFERENCE

The primary objective of the S&EIA process is to present sufficient information to the competent authority (CA) and interested and affected parties (I&APs) on predicted potential impacts and associated mitigation measures required to avoid or mitigate potential negative impacts, as well as to improve or maximise the potential benefits of the development.

In terms of legal requirements, the NEMA EIA Regulations 2014, as amended, regulate and prescribe the content of the EIA Report and specify the type of supporting information that must accompany the submission of the report to the authorities. Table 2.1 shows how and where the legal requirements are addressed in this EIA Report. Section 9 of this EIAr provides a summary of the Public Participation Process (PPP) and Volume III of this EIAr includes all Public Participation undertaken to date. As comments were received these have been collated and included in this EIAr.

As per the EIA Regulations 2014, as amended, 'the objective of the environmental impact assessment process is to, through a consultative process -

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted scoping report;

(c) identify the location of the development footprint within the approved site as contemplated in the accepted scoping report 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;

(d) determine the:

(i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and

(ii) degree to which these impacts –

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources, and

(cc) can be avoided, managed or mitigated;

(e) identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity;

(g) identify suitable measures to avoid, manage or mitigate identified impacts; and

(h) identify residual risks that need to be managed and monitored.'

The above activities are completed through consultation with:

- The lead authority involved in the decision-making for the application (in this case, the DFFE);
- I&APs, provincial and local governments, and other relevant organisations to ensure that local issues are well understood; and
- The specialist team to ensure that technical issues are identified.

TABLE 2-1 LEGISLATIVE REQUIREMENTS FOR SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

Appendix 3 Requirements NEMA, 1998 (Act No. 107 of 1998)		**Location in EIA**
3 (1)	*An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include-*	
(a)	*details of-* *the EAP who prepared the report; and* *the expertise of the EAP, including a curriculum vitae;*	Section 2 Appendix A
(b)	*the location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including-* *the 21-digit Surveyor General code of each cadastral land parcel;* *where available, the physical address and farm name;* *where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties;*	Executive Summary Figure 1 and 2
(c)	*a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is-* *a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or* *on land where the property has not been defined, the coordinates within which the activity is to be undertaken;*	Figure 3
(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 associated structures and infrastructure related to the development;*	Section 3.2
(e)	*a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;*	Section 3 and 5
(f)	*a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report;*	Section 5
(g)	*a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;*	Section 8
(h)	*a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including:*	
	details of the development footprint alternatives considered;	Section 7

Appendix 3 Requirements NEMA, 1998 (Act No. 107 of 1998)		Location in EIA
	details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 9 Volume 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;	Section 9
	the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 6
	the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- *(aa) can be reversed;* *(bb) may cause irreplaceable loss of resources; and* *(cc) can be avoided, managed or mitigated;*	Section 10 and 11
	the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Section 4 Volume II
	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;	Section 10 and 11
	the possible mitigation measures that could be applied and level of residual risk;	Section 10 and 11
	if no alternative development footprints were investigated, the motivation for not considering such; and	Section 7
	a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;	Section 8
(i)	*a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred development footprint within the approved site as contemplated in the accepted scoping report through the life of the activity, including -*	
	a description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Section 10
	an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 10
(j)	*an assessment of each identified potentially significant impact and risk, including-* *cumulative impacts;* *the nature, significance and consequences of the impact and risk;* *the extent and duration of the impact and risk;* *the probability of the impact and risk occurring;* *the degree to which the impact and risk can be reversed;* *the degree to which the impact and risk may cause irreplaceable loss of resources; and* *the degree to which the impact and risk can be mitigated;*	Section 11
(k)	*where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how*	Section 12

Appendix 3 Requirements NEMA, 1998 (Act No. 107 of 1998)		Location in EIA
	these findings and recommendations have been included in the final report;	
(l)	*an environmental impact statement which contains-* *a summary of the key findings of the environmental impact assessment;* *a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and* *a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;*	Section 12 and 13 Figure 7
(m)	*based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;*	Section 12 and 13 Appendix B
(n)	*the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;*	Section 8
(o)	*any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;*	Section 13
(p)	*a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;*	Section 2 Volume II
(q)	*a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;*	Section 13
(r)	*where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;*	The proposed activity includes operational aspects.
(s)	*an undertaking under oath or affirmation by the EAP in relation to-* *the correctness of the information provided in the reports;* *the inclusion of comments and inputs from stakeholders and I&APs;* *the inclusion of inputs and recommendations from the specialist reports where relevant; and* *any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties; and*	Appendix A
(t)	*where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;*	Appendix B
(u)	*An indication of any deviation from the approved scoping report, including the plan of study, including-* *any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and* *a motivation for the deviation;*	n/a Specialist following the same methodology and protocols in the EIA phase and followed during the scoping phase. There are no

Appendix 3 Requirements NEMA, 1998 (Act No. 107 of 1998)		Location in EIA
		deviations from the approved Plan of Study
(v)	*any specific information that may be required by the competent authority; and*	Section 13
(w)	*any other matters required in terms of section 24(4)(a) and (b) of the Act.*	n/a
3 (2)	*Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to an environmental impact assessment report the requirements as indicated in such notice will apply.*	Volume 4 Volume II

2.1 STRUCTURE OF THE EIA REPORT

The EIA report is set out in three volumes:

Volume I: EIA Report;

Volume II: Specialist Reports; and

Volume III: Public Participation Report (including Comments and Responses table).

2.2 DEVIATIONS FROM PLAN OF STUDY

There are no deviations from the approved Plan of Study Area (PSEIA).

2.3 THE APPLICANT

The Project Applicant appointed ERM, with the lead EAP being Stephanie Gopaul to co-ordinate and manage the S&EIA application process. The appointed specialist team was based on the results of the DFFE Screening Tool Report generated.

Name of the Applicant	Boshoek Solar 1 (Pty) Ltd		
Name of contact person for applicant (if other)	Anthony De Graaf		
Company Registration Number	2023/879422/07		
BBBEE status	n/a		
Physical address	101 West Quay Building 7 West Quay Road Waterfront Western Cape		
Postal address	Same as above		
Postal code	8000	Cell:	+ 27 (0) 76 342 8973
Telephone	-	Fax:	-
E-mail	anthony@atlanticep.com		

2.4 DETAILS OF THE EAP

The co-ordination and management of this environmental application process is being conducted by Environmental Resources Management Southern Africa (Pty) Ltd (`ERM) with the lead EAP

being Stephanie Gopaul (Table 2-2). Refer to Appendix A for the EAP's Declaration of Interest and Curriculum Vitae.

TABLE 2-2 DETAILS OF THE ENVIRONMETNAL ASSESSMENT PRACTITIONER

Company of EAP	**Environmental Resource Management Southern Africa (Pty) Ltd.**
EAP name and surname	Stephanie Gopaul
EAP Qualifications and Professional affiliations	• Masters in Environmental Management, University of the Free State, South Africa, 2012 • BSc. Environmental and Engineering Geology, University of KwaZulu Natal, South Africa, 2005
Physical address	Regus, Floor -3, 18 The Boulevard, Westway Office Park, Westville, Durban
Postal address	As above
Postal code	3629
Telephone	+27105963502
Cell phone	+27656660066
E-mail	stephanie.gopaul@erm.com / erm.boshoek@erm.com

2.4.1 THE S&EIA PROJECT TEAM

TABLE 2-3 DETAILS OF S&EIA PROJECT TEAM

Assessment	**Name of Specialist**	**Company**
Consultant	Lucien Barbeau	ERM SA (Pty) Ltd
Soil, Land-use and Land Capability Assessment	Johann Lanz	Independent Consultant
Freshwater Impact Assessment Report	Gerhard Botha	Nkurenkuru Ecology and Biodiversity
Terrestrial Biodiversity Impact Assessment Report	Gerhard Botha	Nkurenkuru Ecology and Biodiversity
Fauna Impact Assessment Report	Gerhard Botha	Nkurenkuru Ecology and Biodiversity
Avifauna Impact Assessment Report	Ryno Kemp	The Biodiversity Company
Heritage, Archaeology and Paleontology Scoping Report	Jessica Angel	PGS Heritage
Transport Assessment Report	Stephen Fautley	Techso (Pty) Ltd
Visual Impact Assessment Report	Graham A Young	GYLA
Social Impact Assessment Report	Cornelius Holtzhausen	Savannah Environmental (Pty) Ltd

2.5 ASSUMPTIONS AND LIMITATIONS

The assumption is made that the information on which this report is based (baseline studies and project information, as well as existing information) is accurate and correct. The following assumptions and limitations are noted for the EIA report and the specialist studies conducted (Volume II) as part of the proposed developments' EIA process.

2.5.1 SOIL, LAND USE AND AGRICULTURAL POTENTIAL

There were no specific assumptions, uncertainties or gaps in knowledge or data that affected the findings of the study.

2.5.2 FRESHWATER AND WETLANDS

GENERAL ASSUMPTIONS AND LIMITATIONS

- This report deals exclusively within a defined area as well as downstream freshwater/aquatic resources that may potentially be impacted and which fall within the Regulated Areas (500 m) as defined by DWS;
- All relevant project information provided by the applicant and engineering design team to the specialist was correct and valid at the time that it was provided; and
- Additional information used to inform the assessment was limited to data and GIS coverage's available for the North West Province at the time of the assessment.

SAMPLING LIMITATIONS AND ASSUMPTIONS

- While disturbance and transformation of habitats can lead to shifts in the type and extent of ecosystems, it is important to note that the current extent and classification are reported on here;
- The delineation of the outer boundary of riparian areas is based on several indicators, including topography (macro-channel features), the presence of alluvial deposition and vegetation indicators. The boundaries mapped in this specialist report, therefore, represent the approximate boundary of riparian habitat as evaluated by an assessor familiar and well-practiced in the delineation technique;
- The accuracy of the delineation is based solely on the recording of the relevant onsite indicators using a GPS. GPS accuracy will, therefore, influence the accuracy of the mapped sampling points and therefore resource boundaries and an error of 3 – 5m can be expected. All soil/vegetation/terrain sampling points were recorded using a Garmin etrex Touch 35 Positioning System (GPS) and captured using Geographical Information Systems (GIS) for further processing;
- Any freshwater resources that fall outside of the affected catchment (but still within the 500m DWS regulated area) and are not at risk of being impacted by the specific activity were not delineated or assessed. Such features were flagged during a baseline desktop assessment before the site visit;
- Sampling by its nature means that generally not all aspects of ecosystems can be assessed and identified;
- While every care is taken to ensure that the data presented are qualitatively adequate, inevitably conditions are never such that that is possible. The nature of the vegetation, seasonality, human intervention etc. limit the veracity of the material presented;

- No water sampling and analysis was undertaken;
- The vegetation information provided is based on onsite/ infield observations and not formal vegetation plots. As such, the species list provided only gives an indication of the dominant and/or indicator wetland/riparian species and thus only provides a general indication of the composition of the vegetation communities;
- No faunal sampling and/or faunal searches were conducted and the assessment was purely wetland and riverine habitat based;
- Probably the most significant potential limitation associated with such a sampling approach is the narrow temporal window of sampling:

  - Ideally, a site should be visited several times, during different seasons to ensure that the full complement of plant and animal species present is captured.

  - However, this is rarely possible due to time constraints and therefore, the representation of the species sampled at the time of the site visit should be critically evaluated.

  - The footprint was covered in detail and results are considered highly reliable and it is unlikely that there are any significant species or features present that were not recorded.

BASELINE ASSESSMENT – LIMITATIONS AND ASSUMPTIONS

- All assessment tools utilised within this study were applied only to the resources and habitats located within the development footprint as well as the 500m DWS "regulated area" around the footprint area, and which are at risk of being impacted by the proposed development. Any resource located outside of the DWS "regulated area" and which is not a risk of being impacted was not assessed;
- It should be noted that the most appropriate assessment tools were selected for the analysis of the specific features and resources that may potentially be impacted by the proposed development. The selection was based on the specialist's knowledge and experience of these tools and their attributes and shortcomings;
- Furthermore, it should be noted that these assessment techniques and tools are currently the most appropriate available tools and techniques to undertake assessments of freshwater resources, there are however rapid assessment tools that rely on qualitative information and expert judgment. While these tools have been subjected to peer review processes, the methodology for these tools is ever-evolving and will likely be further refined in the near future. For the purposes of this assessment, the assessments were undertaken at rapid levels with somewhat limited field verification. It, therefore, provides an indication of the Present Ecological State (PES) of the portions of the affected systems rather than providing a definitive measure; and
- The PES, Ecological Importance and Sensitivity (EIS) and functional assessments undertaken are largely qualitative assessment tools and thus the results are open to professional opinion and interpretation. All claims were substantiated where applicable and necessary.

The assessment of impacts and recommendation of mitigation measures was informed by the site-specific ecological concerns arising from the field survey and based on the assessor's working knowledge and experience with similar development projects.

The impact descriptions and assessment are based on the author's understanding of the proposed development based on the site visit and information provided.

Evaluation of the significance of impacts with mitigation takes into account mitigation measures provided in this report and standard mitigation measures to be included in the Environmental Management Programme (EMPr).

2.5.3 TERRESTRIAL BIODIVERSITY

This report deals exclusively with a specifically defined area, and the impacts upon plant and animal biodiversity and natural terrestrial and aquatic/freshwater resource ecosystems in that area. As such:

- All relevant project information provided by the applicant and engineering design team to the ecological specialist was correct and valid at the time that it was provided.

Temporal variation plays an important role in the structure and patterns of plant biodiversity, communities, and species occurrences. One site visit might, therefore, not fully catalogue plant species diversity in an area (for example, due to seasonal vegetation variation). The site was surveyed in a dry period, and outside of the peak flowering season. However, most plants were easily identifiable. Thus, the vegetation of the area was likely reasonably well documented.

Nevertheless, some annual, short-lived, ephemeral (plants surviving unfavourable conditions as seeds), geophytic (species with underground storage organs), or other cryptic species might not have been observed/detected. For example, some plant species of the families *Amaryllidaceae*, *Colchicaceae*, *Eriospermaceae, Hyacinthaceae, Hypoxidaceae, Iridaceae*, and *Orchidaceae*, among others, are known to completely die back during certain times of the year, depending on respective life strategies. Thus, during these times such species remain unobservable/undetectable and survive only as dormant bulbs, corms, tubers, or rhizomes below the soil surface. Together with this, rare and threatened plant species are generally uncommon and/or localised and can easily be overlooked. Even multiple site visits might therefore fail to locate such species.

Furthermore, flowers and fruits are crucial for the complete and accurate identification of plant species, and any absence of such flowers and fruits might prevent the complete and accurate identification of such plant species. Flowering and fruiting times are species specific, and there are invariably always some plant species not flowering and/or fruiting during surveying. This not only impacts identifiability, but also detectability/visibility.

Finally, in principle, it is impossible to survey any area to its full extent, both physically and temporally. The total number of plant species recorded in any area is, therefore, almost always an underestimate of the potential number of species that could occur in such an area.

Considering all of the aforementioned, the author(s) declare a gap in knowledge as to: the potential presence of plant species that might not have been observed/detected on site during the time of surveying, as a result of their potential annual, short-lived, dormant, cryptic, or ephemeral nature, their rare and localised distributions on site, or the incomplete and inaccurate identification of plant species which lacked flowers and/or fruits and/or other characteristic features. A list of SoCC known to occur in the study area (as per SANBI online databases) was used to supplement the list of species recorded during the survey(s). This final combined list is likely sufficiently conservative and cautious to account for the study limitations.

2.5.4 AVIFAUNA

The following assumptions and limitations should be noted for the assessment:

- The proposed project area, and this was delineated to provide the PAOI. See section 2.1 of this report for additional details. Any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;
- Two site visits were conducted for this regime 2 assessment in winter over the 9-11th of June 2023 and in spring over the 16 - 17th of September 2023. These site visits are considered sufficient from a seasonal perspective and require no additional season assessment. However, the data was compared to the following dataset listed in Section 4.2 and no differences were observed, further suggesting that sufficient data sampling was conducted to better our understanding of the bird community in the area;
- Whilst every effort was made to cover as much of the PAOI as possible, it is possible that some species that are present within the PAOI were not recorded during the field investigations due to their secretive behaviour; and
- The GPS used in the assessment has an accuracy of 5 m, and consequently, any spatial features delineated may be offset by up to 5 m.

2.5.5 HERITAGE, ARCHAEOLOGY AND PALEONTOLOGY

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and existing vegetation cover. It should be noted most of the study area was accessible for the fieldwork survey.

Fieldwork was also focused on area that was not previously ploughed or disturbed by farming activity, thus focusing on areas with the highest potential to yield heritage resources.

Therefore, should any heritage features and/or objects be located or observed outside the identified heritage sensitive areas during the construction activities, a heritage specialist must be contacted immediately. Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. If any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

The focal point of geological maps is the geology of the area and the sheet explanations of the Geological Maps were not meant to focus on paleontological heritage. Many inaccessible regions of South Africa have never been reviewed by paleontologists and data is generally based on aerial photographs alone. Locality and geological information of museums and universities databases have not been kept up to date or data collected in the past have not always been accurately documented.

Comparable Assemblage Zones in other areas is also used to provide information on the existence of fossils in an area which has not documented in the past. When using similar Assemblage Zones and geological formations for Desktop studies it is generally assumed that exposed fossil heritage is present within the footprint. A field-assessment will thus improve the accuracy of the desktop assessment.

2.5.6 VISUAL/LANDSCAPE

The following assumptions limitations have been made in the study:

- The description of project components is limited to what has been supplied to the author prior to the date of completion of this report;
- Site photos taken in winter and do not necessarily reflect the complete landscape character of the area as experienced through all seasons. The weather was sunny, with slight haze conditions; and
- At the time of writing the report, the public participation process had not been completed.

2.5.7 SOCIO-ECONOMIC

This Social Impact Assessment (SIA) Report is intended to provide an overview of the current social environmental and assist in the identification of potential social impacts.

This SIA Report was prepared based on information which was available to the specialist at the time of preparing the report. The sources consulted are not exhaustive, and the possibility exists that additional information which might strengthen arguments, contradict information in this report, and / or identify additional information might exist.

Some of the project projections reflected in this SIA Report (i.e., with regards to job creation and local content) may be subject to change, and therefore may be higher or lower than those estimated by the project proponent.

It is assumed that the motivation for, and planning and feasibility study of the project was undertaken with integrity; and that information provided by the project proponent was accurate and true at the time of preparing this SIA Report.

2.5.8 TRAFFIC AND TRANSPORTATION

The following assumptions were made:

- The National Road network and high order arterials that form part of the abnormal road network will be used for long distance equipment deliveries to site with abnormal loads being transported under permit to be obtained by the abnormal load transport carrier;
- The National Road network and high order arterials are designed to effectively accommodate heavy vehicle loads (Section 6); and
- The construction period is over 9 month period.

3. ENVIRONMENTAL LEGAL FRAMEWORK

The proposed development requires EA prior to being constructed and operated. This section of the report highlights the important environmental legal considering during the EIA process.

3.1 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO 107 OF 1998)

Section 2 of the National Environment Management Act, 1998 (NEMA) as amended, lists environmental principles that are to be applied by all organs of state regarding developments that may significantly affect the environment. Included amongst the key principles is the principle that all developments must be socially, economically and environmentally sustainable, and environmental management must place people and their needs at the forefront of its concern, to serve their physical, psychological, developmental, cultural and social interests equitably.

NEMA, as amended, also provides for the participation of potential and registered I&APs and it stipulates that decisions must take the interests, needs and values of all I&APs into account.

Chapter 5 of NEMA, as amended, outlines the general objectives and implementation of Integrated Environmental Management (IEM), the latter providing a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for the granting of EAs.

To give effect to the general objectives of IEM, the potential impacts on the environment of listed activities must be considered, investigated, assessed and reported to the competent authority. Section 24(4) outlines the minimum requirements for procedures for the investigation, assessment and communication of the potential impact of activities.

3.2 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGULATIONS, 2014 AS AMENDED

The EIA Regulations 2014 as amended by GNR 326 of 2017 provide for the control of certain Listed Activities. These activities are listed in Government Notice No. R327 (Listing Notice 1 – Basic Assessment), R325 (Listing Notice 2 – Scoping & EIA Process) and R324 (Listing Notice 3 – Basic Assessment) of 7 April 2017, and are prohibited to commence until environmental authorisation has been obtained from the competent authority, in this case, the DFFE.

The DFFE is the competent authority for all renewable energy proposals which will be bid into the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), as NEMA, as amended, states that:

"24C. (2) The Minister must be identified as the competent authority in terms of subsection (1) if the activity- (a) has implications for international environmental commitments or Relations"

It is the intention of the Project Applicant to bid the Boshoek Solar 1 SEF in the seventh bidding window of the REIPPPP with the aim of evacuating the generated power from the SEF into the National Eskom Grid.

EA, which may be granted subject to conditions, will only be considered upon compliance with GNR982, as amended by GNR326 of 7 April 2017.

Any EA obtained from the DFFE applies only to those specific listed activities for which the application was made. To ensure that all Listed Activities that could potentially be applicable to this proposal are covered by the EA, a precautionary approach is followed when identifying listed activities, that is, if an activity could potentially be part of the proposed development, it is listed.

The Listed Activities applicable to this proposed project are presented in Table 3-1 below. All potential impacts associated with these Listed Activities will be considered and adequately assessed in this authorisation process.

TABLE 3-1 NEMA LISTED ACTIVITIES APPLICABLE TO THE BOSHOEK SOLAR 1 DEVELOPMENT

Listing Notices 1, 2 and 3 07 April 2017	**Listed Activity**	**Description of project activity that triggers listed activity**
Listing Notice 1 GN R 327 Activity 11	*The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.*	The facility will entail the construction of an on-site up to 132kV substation and overhead transmission powerline to facilitate the connection between the solar farm and the national grid collector switching station.
Listing Notice 1 GN R 327 Activity 12	*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; (c) if no development setback exists within 32 m of a watercourse, measured from the edge of a watercourse.*	The facility will entail the construction of built infrastructure and structures (such as panel mounting structure, panel foundations, offices, workshops, Operations and Maintenance (O&M) buildings, BESS, ablution facilities, onsite substations, laydown areas and security enclosures etc.). The infrastructure and structures are expected to exceed a footprint of 100 m^2 and could occur within small drainage features and 32 m of the watercourses.
Listing Notice 1 GN R 327 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;*	The facility will entail the excavation, removal and moving of more than 10 m^3 of soil, sand, pebbles, or rock from nearby watercourses on site, mainly for the purpose of constructing access roads. Details of the infilling of and excavations from the affected watercourses / drainage features will be confirmed during the detailed engineering design phase.
Listing Notice 1 GN R 327 Activity 24	*The development of a road- (ii) with a reserve wider than 13.5 meters, or where no reserve exists where the road is wider than 8 meters*	Roads with a reserve wider than 13.5 meters are proposed for the facility.
Listing Notice 1 GN R 327 Activity 28	*Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:*	The facility will take place outside of an urban area, and is considered as a commercial / industrial development, which will have an estimated total development footprint of more than 20 ha. The facility will entail the construction of solar facility, including on-site substations, a BESS, and various associated structures and

Listing Notices 1, 2 and 3 07 April 2017	**Listed Activity**	**Description of project activity that triggers listed activity**
	(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.	infrastructure. This will constitute infrastructure with a total physical footprint of more than 1 ha.
Listing Notice 1 GN R 327 Activity 48	*The expansion of- Infrastructure or structures where the physical footprint is expanded by 100 square metres or more; where such expansion occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.*	The facility will require the upgrading of existing roads within the development area, as well as watercourse crossing upgrades, where such upgrades may take place within watercourses and within 32 m from the edge of these watercourses. The total footprint of the upgrades to be undertaken on the existing roads would be in excess of 100 m^2 within a watercourse, or within 32 m of a watercourse.
Listing Notice 1 GN R 327 Activity 56	*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.*	Existing roads will be widened by more than 6 m and will require lengthening by more than 1 km, to accommodate the movement of heavy vehicles and cable trenching activities associated with the facility.
Listing Notice 2		
Listing Notice 2 GN R 325 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.*	The facility will comprise a maximum generation capacity of more than 20 MW (i.e., for the generation of electricity from a renewable resource).
Listing Notice 2 GN R 325 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*	The construction of the facility will require clearance of more than 20 hectares of indigenous vegetation.
Listing Notice 3		
Listing Notice 3 GN R 324 Activity 4	*The development of a road wider than 4 metres with a reserve less than 13,5 metres (h) North West (iv) Critical Biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;*	The facility will require the development of roads wider than 4 m within areas which contain indigenous vegetation.
Listing Notice 3 GN R 324 Activity 12	*The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required*	The facility will require the clearance of natural vegetation in excess of 300 m^2 in areas of natural vegetation. Portions of the respective facility are located within Critical Biodiversity

Listing Notices 1, 2 and 3 07 April 2017	**Listed Activity**	**Description of project activity that triggers listed activity**
	for maintenance purposes undertaken in accordance with a maintenance management plan. *(h) North West* *(iv) Critical biodiversity areas identified in systematic bioregional plans adopted by the competent authority;*	Areas (CBAs) and Ecological Support Areas (ESAs).
Listing Notice 3 GN R 324 Activity 14	*The development of—* *(ii) channels exceeding 10 square metres in size;* *(h) North West* *(iv) Critical biodiversity areas identified in systematic bioregional plans adopted by the competent authority;*	The proposed development will entail the development of infrastructure with physical footprints of 10m^2 or more within a watercourse / surface water feature or within 32 m from the edge of a watercourse / surface water feature. Although the layout of the proposed development will be designed to avoid the identified surface water features / watercourse as far as possible, some of the infrastructure / structures will likely need to traverse the identified surface water features / watercourses. The construction of the infrastructure for the development will occur within CBAs and Ecological Support Areas (ESAs) located outside of urban areas.
Listing Notice 3 GN R 324 Activity 18	*The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.* *(h) North West* *(v) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority*	Internal access roads will be required to access the facility as well as the respective substations. Existing roads will be used wherever possible. Internal access roads will thus likely be widened by more than 4 m or lengthened by more than 1 km. These roads will occur within the North West Province, outside urban areas. The respective proposed development sites contain indigenous vegetation.
Listing Notice 3 GN R 324 Activity 23	*The expansion of—* *channels where the channel is expanded by 10 square metres or more;* *(i) North West* *(iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority.*	The facility will likely entail the development and expansion of roads by 10m^2 or more within a surface water feature / watercourse or within 32 m from the edge of a surface water feature / watercourse. Although the layout will be designed to avoid the identified surface water features / watercourses as far as possible, some of the existing internal and access roads may likely need to traverse some of the identified surface water features / watercourses. The facility will occur within a CBA, and is located outside urban areas.

3.3 THE NATIONAL HERITAGE RESOURCES ACT, 1999 (ACT NO 25 OF 1999 - NHRA)

Section 38 (1) of the National Heritage Resources Act, 1999 (NHRA) lists development activities that would require authorisation by the responsible heritage resources authority. Activities considered applicable to the proposed project include the following:

- "(a) The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- (c) any development or other activity which will change the character of a site; and
- (i) exceeding 5000 m² in extent."

The NHRA, 1999, requires that a person intending to undertake such an activity must notify the relevant national and provincial heritage authorities at the earliest stages of initiating such a development. The relevant heritage authority would then in turn, notify the person whether a Heritage Impact Assessment Report should be submitted. According to Section 38(8) of the NHRA, 1999, a separate report would not be necessary if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (No. 73 of 1989) (ECA) (now replaced by NEMA, Act 107 of 1998) or any other applicable legislation. The decision-making authority must ensure that the heritage evaluation fulfils the requirements of the NHRA, 1999, and consider any comments and recommendations made by the relevant heritage resources authority.

The Heritage Assessment, which forms part of this scoping and EIA process has been submitted to the North West Provincial Heritage Resources Authority (NWPHRA), via the South African Heritage Resources Information System (SAHRIS), for comment.

In South Africa, the law is directed towards the protection of human-made heritage, although places and objects of scientific importance are covered. The NHRA, 1999, also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. While not specifically mentioned in the NHRA, scenic routes are recognised as a category of heritage resources which requires grading as the Act protects area of aesthetic significance.

3.4 NATIONAL DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT (DALRRD)

A renewable energy facility requires approval from the National Department of Agriculture, Land Reform and Rural Development (DALRRD) if the facility is on agriculturally zoned land. A No Objection Letter for the change in land use is required. This letter is one of the requirements for receiving municipal rezoning. This application requires a motivation backed by good evidence that the development is acceptable in terms of its impact on the agricultural production potential of the development site. This process is separate to the S&EIA process and should not affect the EA decision.

3.5 SUBDIVISION OF AGRICULTURAL LAND ACT, 1970 (ACT NO. 70 OF 1970 - SALA)

In terms of the Subdivision of Agricultural Land Act, 1970, any application for change of land use must be approved by the Minister of Agriculture. This is a consent for long-term lease in terms of the SALA. If DALRRD approval for the development has already been obtained in the form of the No Objection letter, then SALA approval should not present any difficulties. Note that

SALA approval is not required if the lease is over the entire farm portion. SALA approval (if required) can only be applied for once the Municipal Rezoning Certificate and EA has been obtained.

3.6 CONSERVATION OF AGRICULTURAL RESOURCES, 1983 (ACT NO. 43 OF 1983)

The Conservation of Agricultural Resources Act (CARA), 1983 states that no degradation of natural land is permitted. The Act requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.

Rehabilitation after disturbance to agricultural land is managed by the CARA. A consent in terms of CARA is required for the cultivation of virgin land. Cultivation is defined in CARA as "any act by means of which the topsoil is disturbed mechanically". The purpose of this consent for the cultivation of virgin land is to ensure that only land that is suitable as arable land is cultivated. Therefore, despite the above definition of cultivation, disturbance to the topsoil that results from the construction of a renewable energy facility and its associated infrastructure does not constitute cultivation as it is understood in CARA. This has been corroborated by Anneliza Collett (Acting Scientific Manager: Natural Resources Inventories and Assessments in the Directorate: Land and Soil Management of the Department of Agriculture, Land Reform and Rural Development (DALRRD)). The construction and operation of the facility will therefore not require consent from the Department of Agriculture, Land Reform and Rural Development in terms of this provision of CARA.

3.7 NATIONAL VELD AND FOREST FIRE ACT, 1998 (ACT NO. 101 OF 1998)

The purpose of the National Veld and Forest Fire Act, as amended by the National Fire Laws Amendment Act (Act 12 of 2001), is to prevent and combat veld, forest and mountain fires throughout South Africa. The Act applies to the open countryside beyond the urban limit and puts in place a range of requirements. It also specifies the responsibilities of landowners. The term 'owners' includes lessees, people in control of land, the executive body of a community, the manager of State land, and the chief executive officer of any local authority. The requirements include, but are not limited to, the maintenance of firebreaks and availability of firefighting equipment to reasonably prevent the spread of fires to neighbouring properties.

3.8 THE ENVIRONMENT CONSERVATION ACT, 1989 (ACT NO.73 OF 1989), THE NATIONAL NOISE CONTROL REGULATIONS: GN R154 OF 1992

The Environment Conservation Act, 1989 (ECA) allows the Minister of Environmental Affairs and Tourism (now the "Minister of Forestry, Fisheries and the Environment") to make regulations regarding noise, amongst other concerns. The Minister has made noise control regulations under the ECA.

In terms of section 25 of the ECA, the national noise-control regulations (NCR) were promulgated (GN R154 in Government Gazette No. 13717 dated 10 January 1992). The NCRs were revised under Government Notice Number R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations.

Subsequently, in terms of Schedule 5 of the Constitution of South Africa of 1996 legislative responsibility for administering the NCR was devolved to provincial and local authorities.

These regulations define "disturbing noise" as:

> *"Noise level which exceeds the zone sound level or, if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more".*

3.9 NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 2004 (ACT NO. 39 OF 2004)

Section 34 of the Air Quality Act, 2004 (AQA) makes provision for:

(1) The Minister to prescribe essential national noise standards –

a. For the control of noise, either in general or by specified machinery or activities or in specified places or areas; or

b. For determining –

i. a definition of noise; and

ii. the maximum levels of noise.

(2) When controlling noise, the provincial and local spheres of government are bound by any prescribed national standards.

This section of the Act is in force, but no such standards have yet been promulgated.

An atmospheric emission license issued in terms of Section 22 may contain conditions in respect of noise. This, however, will not be relevant to this proposed development.

3.9.1 NATIONAL DUST CONTROL REGULATIONS, 2013

The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004), makes provision for national dust control regulations. These regulations prescribe dust fall standards for residential and non-residential areas. These Regulations also provide for dust monitoring, control and reporting.

There is no requirement for an Air Emissions License (AEL) for the construction and operation of the Boshoek Solar 1 SEF, the dust control regulations will be applicable during construction.

3.10 NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998 - NWA)

The National Water Act, 1998 (NWA) provides for constitutional requirements including pollution prevention, ecological and resource conservation and sustainable utilisation. In terms of this Act, all water resources are the property of the State.

A water resource includes any watercourse, surface water, estuary or aquifer, and, where relevant, its bed and banks. A watercourse is interpreted as a river or spring; a natural channel in which water flows regularly or intermittently; a wetland lake or dam into which or from which water flows; and any collection of water that the Minister may declare to be a watercourse.

Relevant water uses for the proposed construction of the SEF which will require access roads over watercourses and drainage channels, in terms of Section 21 of the Act include but are not limited to the following:

- Section 21 (c): Impeding or diverting the flow of water in a watercourse; and
- Section 21 (i): Altering the bed, banks, course or characteristics of a watercourse.

GN 1199 of 18 December 2009 grants general authorisation (GA) for the above water uses based on certain conditions. It also stipulates that these water uses must be registered with the responsible authority.

Pollution of river water is a contravention of the NWA. Chapter 3, Part 4 of the NWA deals with pollution prevention and in particular the situation where pollution of a water resource occurs or might occur as a result of activities on land. The person who owns, controls, occupies or uses the land in question is responsible for taking measures to prevent pollution of water resources.

Chapter 3, Part 5 of the NWA deals with pollution of water resources following an emergency incident, such as an accident involving the spilling of a harmful substance that finds or may find its way into a water resource. The responsibility for remedying the situation rests with the person responsible for the incident or the substance involved.

3.10.1 PERMIT REQUIREMENTS

A Water Use License Application (WULA) or a General Application (GA) may be required. This will be determined by the Department Water and Sanitation (DWS) during the WULA pre-application process.

This process will run separate to this EA application process.

3.11 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 2004 (ACT NO. 10 OF 2004 - NEMBA)

Threatened or Protected Species List, 2015

Amendments to the Threatened or Protected Species (TOPS) list were published on 31 March 2015 in Government Gazette No. 38600 and Notice 256 of 2015. Certain flora and fauna that occur on the site may be threatened or protected.

TOPS permits for the carrying out of restricted activities in terms of the NEMBA, Act 2004 may be required. TOPS permits are submitted to either the national minister or the provincial minister. In terms of the legislation, the relevant issuing authority for the current project would be the office of the MEC of the province..

Alien and Invasive Species Regulations, 2016

The Act and Regulations set out various degrees of Invasive Species (Plants, Insects, Birds, Animals, Fish and Water Plants) and requires that certain of those invasive species are documented and, in some cases, removed from properties in South Africa. The management of the Alien and Invasive Species has been considered in the EIA phase.

3.12 NATIONAL ENVIRONMENTAL MANAGEMENT PROTECTED AREAS ACT (NO. 57 OF 2003)

The purpose of the National Environmental Management Protected Areas Act (No. 57 of 2003) (NEMPAA) is to, inter alia, provide for the protection and conservation of ecologically viable areas representative of South Africa’s biological diversity and its natural landscapes and seascapes.

3.13 NATIONAL FORESTS ACT, 1998 (ACT NO. 84 OF 1998 - NFA)

This act lists protected tree species and prohibits certain activities. The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell or donate."

3.14 NATIONAL ROAD TRAFFIC ACT, 1996 (ACT NO. 93 OF 1996) (NRTA)

The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed.

Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts.

The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.

3.15 CIVIL AVIATION ACT, 2009 (ACT NO. 13 OF 2009) (CAA)

The Civil Aviation Act, 2009 (Act No. 13 of 2009) (CAA), governs civil aviation in the Republic. The Act provides for the establishment of a stand-alone authority mandated with the controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by the South African Civil Aviation Authority (SACAA), an agency of the Department of Transport (DoT).

The SACAA achieves the objectives of the Act by complying with the Standard and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations (SA CARs).

The SACAA and Air Traffic Navigation Services (ATNS) is included as a stakeholder and have been provided with an opportunity to comment on the EIA during the public participation process.

3.16 ELECTRICITY REGULATION ACT (NO. 4 OF 2006)

The Act establishes a National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated.

Additionally the Act aims to achieve the efficient, effective, sustainable and orderly development and operation of electricity supply infrastructure in South Africa as well as ensuring that the interests and needs of present and future electricity customers and end users are safeguarded and met, having regard to the governance, efficiency, effectiveness and long-term sustainability of the electricity supply industry within the broader context of economic energy regulation within South Africa.

3.17 ADDITIONAL RELEVANT LEGISLATION

The applicant and the EIA must also comply with the provisions of other relevant national legislation. Additional relevant legislation that has informed the scope and content of this EIA Report includes the following:

- Constitution of the Republic of South Africa, 1996 (Act No. 108, 1996);
- Aviation Act, 1962 (Act No. 74, 1962);
- National Environmental Management: Waste Act, 2008 (Act No. 59, 2008);
- National Environmental Management: Protected Areas Act, 2003 (Act No. 57, 2003);
- National Roads Act, 1998 (Act No. 7, 1998);
- National Veld and Forest Fire Bill of 10 July 1998;
- Fertiliser, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947;
- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002);
- Occupational Health and Safety Act (No. 85 of 1993);
- Independent Communications Authority of South Africa Act, 2000 (Act No. 13 of 2000; as amended); and
- Screening Report referred to in Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended.

3.18 CONVENTIONS AND TREATIES

The Paris Agreement (2016)

South Africa is one of 195 countries that are signatory to The Paris Agreement. The Paris Agreement is a legally binding instrument within the United Nations Framework Convention on Climate Change (UNFCCC) that provides guidance for action on climate change, focusing on sustainable development and poverty eradication. It sets the goal of preventing increase in global average temperature to below 2 degrees Celsius and pursuing efforts to limit global temperature increase to 1.5 degrees Celsius. Previous Minister of the DFFE, Ms Edna Molewa, signed the Paris Agreement on Climate Change on behalf of South Africa on 22 April 2016.

The proposed SEF fits the emission reduction targets of the Paris Agreement and its aim of sustainable development.

The Convention on Biological Diversity (CBD) (1993)

This is a multilateral treaty for the international conservation of biodiversity, the sustainable use of its components and fair and equitable sharing of benefits arising from natural resources. Signatories have the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction. South Africa became a signatory to the CBD in 1993, which was ratified in 1995.

The convention prescribes that signatories identify components of biological diversity important for conservation and monitor these components in light of any activities that have been identified which are likely to have adverse impacts on biodiversity. The CBD is based on the precautionary principle which states that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures

to avoid or minimise such a threat and that in the absence of scientific consensus the burden of proof that the action or policy is not harmful falls on those proposing or taking the action.

The Ramsar Convention (1971)

The Convention on Wetlands, called the Ramsar Convention, as it was adopted in the Iranian city of Ramsar in 1971 and came into force in 1975, is an intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources. Under the three pillars of the convention the Contracting Parties commit to work towards the wise use of all their wetlands through national plans, policies and legislation, management actions and public education; designate suitable wetlands for their list of Wetlands of International Importance (the "Ramsar List") and ensure their effective management; and Cooperate internationally on transboundary wetlands, shared wetland systems, shared species, and development projects that may affect wetlands.

The Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention) (1983)

An intergovernmental treaty, concluded under the sponsorship of the United Nations Environment Programme, concerned with the conservation of wildlife and habitats on a global scale. The fundamental principles listed in Article II of this treaty state that signatories acknowledge the importance of migratory species being conserved and agree to take action to this end "whenever possible and appropriate", "paying special attention to migratory species the conservation status of which is unfavourable and taking individually or in cooperation appropriate and necessary steps to conserve such species and their habitat".

The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) (1999)

An intergovernmental treaty developed under the framework of the Convention on Migratory Species (CMS), concerned with the coordinated conservation and management of migratory waterbirds throughout their entire migratory range. Signatories of the Agreement have expressed their commitment to work towards the conservation and sustainable management of migratory waterbirds, paying special attention to endangered species as well as to those with an unfavourable conservation status. The assessment of the ecology and identification of sites and habitats for migratory waterbirds is required to coordinate efforts that ensure that networks of suitable habitats are maintained and investigate problems likely posed by human activities.

3.19 POLICIES AND GUIDELINES

Environmental Impact Assessment Guidelines

Relevant guidelines and policies as applicable to the management of the S&EIA process and to this application have also been considered, as indicated below:

- IEM Guideline Series (Series 3): Stakeholder engagement (2002);
- IEM Guideline Series (Series 4): Specialist studies (2002);
- IEM Guideline Series (Series 5): Impact Significance (2002);
- IEM Guideline Series (Guideline 5): Companion to the EIA Regulations 2010 (October 2012);
- IEM Guideline Series (Series 7): Cumulative Effects Assessment (2002);
- IEM Guideline Series (Guideline 7): Public Participation in the EIA process (October 2012);
- IEM Guideline Series (Series 7): Alternatives in the EIA process (2002);

- IEM Guideline Series (Guideline 9): Draft guideline on need and desirability in terms of the EIA Regulations 2010 (October 2012);
- DEA (2017) Guideline on Need and Desirability, Department of Environmental Affairs (DEA) Pretoria, South Africa (2017);
- IEM Guideline Series (Series 12): Environmental Management Plans (EMP) (2002); and
- IEM Guideline Series (Series 15): Environmental impact reporting (2002).

The Equator Principles (EPs) III, 2013

The principles applicable to the project are likely to include:

- Principle 2: Environmental and Social Assessment;
- Principle 3: Applicable Environmental and Social Standards;
- Principle 4: Environmental and Social Management System and Equator Principles Action Plan;
- Principle 5: Stakeholder Engagement;
- Principle 6: Grievance Mechanism;
- Principle 7: Independent Review;
- Principle 8: Covenants;
- Principle 9: Independent Monitoring and Reporting; and
- Principle 10: Reporting and Transparency.

These principles, among various requirements, include a requirement for an assessment process and an Environmental and Social Management Plan (ESMP) to be prepared by the client to address issues raised in the assessment process and incorporate actions required to comply with the applicable standards, and the appointment of an independent environmental expert to verify monitoring information.

South African Solar Energy Facility Guidelines

The following guidelines and the potential impacts they may have on the surrounding environment were considered:

- Integrated Environmental Management Information Series, in particular Series 2 – Scoping (DEAT, 2002);
- Guideline on Alternatives, EIA Guideline and Information Document Series (DEA&DP, 2010a);
- Guideline on Need and Desirability (DEA, 2017);
- Integrated Environmental Management Guideline Series 7: Public Participation in the EIA Process (DEA, 2010);
- EIA Guideline for Renewable Energy Projects (Department of Environmental Affairs (DEA, 2015); and
- Guidelines for Involving Specialists in the EIA Processes Series (Brownlie, 2005).

International Finance Corporation (IFC) Performance Standards

The IFC's Performance Standards on Social and Environmental Sustainability (Referred to as Performance Standards hereinafter) is an environmental and social risk management tool provided by the IFC for its investment and financing clients, and is also one of the major applicable standards of the Equator Principles. As the global influence of the Equator Principles

has continued to rise, more and more Equator Principles Financial Institutions (EPFI) have been applying the Performance Standards in their assessments of environmental and social impacts. Under this backdrop, the Performance Standards have become the world's leading system and tool for environmental and social risk management.

The IFC Performance Standards encompass eight topics as described in Table 3-2 below. Given that South Africa has a complex and well-balance environmental regulatory system, the IFC Performance Standards are wholly addressed in the NEMA, 1998, as amended, framework.

For reference purposes the Project Applicant, will be referred to as the 'Borrower' in Table 3-2.

The project will not have adverse impacts on PS5: Land Acquisition and Involuntary Resettlement and PS7: Indigenous Peoples as there is no displacement or resettlement, and none such indigenous people are found in the proposed development area of influence.

TABLE 3-2 DESCRIPTION OF THE IFC PERFORMANCE STANDARDS

PS Description	Project Applicability
Performance Standard 1: Assessment and Management of Environmental and Social (E&S) Risks and Impacts Objective: Underscores the importance of identifying E&S risks and impacts and managing E&S performance throughout the life of a project.	
Borrowers are required to manage the environmental and social performance of their business activity, which should also involve communication between the Borrower/Investee, its workers and the local communities directly affected by the business activity. This requires the development of a good management system, appropriate to the size and nature of the business activity, to promote sound and sustainable environmental and social performance as well as lead to improved financial outcomes.	Section 2 of Chapter 1 of the NEMA, as amended, provides details of the environmental management principles that should be adhered to during the entire project life. Chapter 6 of the NEMA EIA Regulations, 2014 (as amended) outlines the requirements for Public Participation in respect of a project. This document represents the S&EIA process (equitable to an ESIA) undertaken for the proposed development, and comprehensively assesses the key environmental and social impacts and complies with the requirements of the NEMA EIA Regulations, 2014 (as amended). The proposed development will be managed in terms of environmental and social impacts through an approved Environmental Management Programme (EMPr) which is drafted as part of the EIA process. The following have been included as part of this Assessment: • Description of relevant Policy; • Identification of Risks and Impacts; • EMPr (included in the EIA phase); • Requirements for Monitoring and Review; • Stakeholder Engagement as part of PPP; • External Communication and Grievance Mechanism; and • Recommendation for ongoing Reporting to Affected Communities.
Performance Standard 2: Labour and Working Conditions Objective: Recognizes that the pursuit of economic growth through employment creation and income generation should be balanced with protection of basic rights for workers.	
For any business, its workforce is a valuable asset and a sound worker-management relationship is a key component of the overall success of the enterprise. By protecting the basic rights of workers, treating workers fairly and providing them with safe and healthy working conditions, Borrowers can enhance the efficiency and productivity of their	Whilst PS 2 is applicable to the proposed development, it will not be addressed in detail in this report as Labour and Working conditions are typically addressed prior to construction, once EA has been awarded. Recommendations are provided concerning development of a detailed Human Resources (HR) and Occupational Health and Safety (OHS) system by the Applicant. In terms of the proposed development, construction will require the appointment of an Engineering, Procurement and Construction (EPC) contractor (and others) for completion.

PS Description	Project Applicability
operations and strengthen worker commitment and retention.	Appointment of contactors and employees will be 'fair and equal', and workers will be provided with a safe, healthy and inclusive work environment. The EMPr will incorporate the requirements for compliance with local and international Labour and Working legislation and good practice on the part of the contractors.
Performance Standard 3: Resource Efficiency and Pollution Prevention Objective: Recognizes that increased industrial activity and urbanization often generate higher levels of air, water and land pollution, and that there are efficiency opportunities.	
Increased industrial activity and urbanization often generate increased levels of pollution to air, water and land that may threaten people and the environment at the local, regional and global level. Borrowers are required to integrate pollution prevention and control technologies and practices (as technically and financially feasible as well as cost-effective) into their business activities.	The Project is not likely to have many large-scale and long-term impacts related to pollution. Measures to address air, water and land pollution have been included in the EMPr. There are no material resource efficiency issues associated with the proposed development and the EMPr includes general resource efficiency measures. The project is not greenhouse gas (GHG) emissions intensive, and the detailed assessment and reporting of emissions is not required. This project, however, seeks to facilitate resource efficiency and pollution prevention by contributing to the South African green economy. The project will not release industrial effluents and waste generation will be managed according to the EMPr. Hazardous materials are not a key issue; small quantities of construction materials (oil, grease, diesel fuel etc.) are the only wastes expected to be associated with the project. Land contamination of the site from previous land use is not a concern as the project area is mostly an agricultural area where low intensity agriculture / grazing is practiced.
Performance Standard 4: Community Health, Safety, and Security Objective: Recognizes that projects can bring benefits to communities but can also increase potential exposure to risks and impacts from incidents, structural failures, and hazardous materials.	
Business activities can increase the potential for community exposure to risks and impacts arising from equipment accidents, structural failures and releases of hazardous materials as well as impacts on a community's natural resources, exposure to diseases and the use of security personnel. Borrowers are responsible for avoiding or minimizing the risks and impacts to community health, safety and security that may arise from their business activities.	The requirements for PS 4 have been addressed in this report and will be managed in accordance with the EMPr. It is understood that the project infrastructure and equipment will be designed to good industry standards to minimise risks to communities, however a community health and safety plan should be compiled by the Applicant prior to construction to meet the requirements of PS 4. To ensure compliance with PS 4, Applicant will need to evaluate the risks and impacts to the health and safety of the affected community during the design, construction and operation of the proposed development and establish preventive measures to address them in a manner commensurate with the identified risks and impacts as contained in this report. Such measures need to adhere to the precautionary principle for the prevention or avoidance of risks and impacts over minimization and reduction.
Performance Standard 5: Land Acquisition and Involuntary Resettlement Objective: Applies to physical or economic displacement resulting from land transactions such as expropriation or negotiated settlements.	
Land acquisition due to the business activities of a Borrowers may result in the physical displacement (relocation or loss of shelter) and economic displacement (loss of access to resources necessary for income generation or as means of	Not Applicable

PS Description	Project Applicability
livelihood) of individuals or communities. Involuntary resettlement occurs when affected individuals or communities do not have the right to refuse land acquisition and are displaced, which may result in long-term hardship and impoverishment as well as environmental damage and social stress. Borrowers are required to avoid physical or economic displacement or minimize impacts on displaced individuals or communities through appropriate measures such as fair compensation and improving livelihoods and living conditions.	
Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources Objective: Promotes the protection of biodiversity and the sustainable management and use of natural resources.	
Protecting and conserving biodiversity (including genetic, species and ecosystem diversity) and its ability to change and evolve, is fundamental to sustainable development. Borrowers are required to avoid or mitigate threats to biodiversity arising from their business activities and to promote the use of renewable natural resources in their operations.	In terms of protecting and conserving biodiversity, specialists have assessed impacts of the proposed development within the area of influence and recommended further measures to prevent/avoid/mitigate these potential impacts. Specialist methods include a combination of literature review, stakeholder engagement and consultation, and in-field surveys. The determination of habitat sensitivity was undertaken within the legal and best practice reference framework for South Africa.
Performance Standard 7: Indigenous Peoples Objective: Aims to ensure that the development process fosters full respect for Indigenous Peoples.	
Indigenous Peoples are recognized as social groups with identities that are distinct from other groups in national societies and are often among the marginalized and vulnerable. Their economic, social and legal status may limit their capacity to defend their interests and rights to lands and natural and cultural resources. Borrowers are required to ensure that their business activities respect the identity, culture and natural resource-based livelihoods of Indigenous Peoples and reduce exposure to impoverishment and disease.	Not Applicable. As per the international instruments under the United Nations (UN) Human Rights Conventions, no indigenous peoples are present within the study area. The Project does not involve displacement.
Performance Standard 8: Cultural Heritage Objective: Aims to protect cultural heritage from adverse impacts of project activities and support its preservation.	
Aims to protect cultural heritage from adverse impacts of project	A cultural heritage impact assessment and paleontological impact assessment has been undertaken for the proposed

PS Description	Project Applicability
activities and support its preservation.	development. Consultation has been undertaken with the SAHRA and will continue during the EIA phase.

4. SCOPE OF WORK AND EIA PHASE METHODOLOGY

The EIA process formally commenced with notifying the CA, in this case the DFFE, of the proposed development through the submission of an application form. The EAP, along with the team of technical specialists, commenced the scoping phase to make informed decisions of the appropriate "scope" of the EIA process. The existing environmental baseline of the site proposed for development is established during this phase through a desktop assessment and site visits. The type of development is considered and its anticipated impacts on the existing environment informs the specialists' studies to be undertaken. The methodology of how these impacts should be assessed within the EIA phase is also determined. The EIA Phase has been undertaken in line with the approved PSEIA. The environmental impacts, mitigation and closure outcomes as well as the residual risks of the proposed activity have been set out in the EIA report.

A Draft Scoping Report (DSR) (ERM, February 2024) for the proposed development was made available for public and stakeholder comment for a prescribed 30-day consultation period from 26 February 2024 to 28 March 2024. All comments received in response to the DSR were considered and as appropriate, incorporated into the FSR and Plan of Study for EIA (PSEIA). The FSR and PSEIA (ERM, March 2024) were then submitted to the DFFE for approval. Interested and Affected Parties (I&APs) were able to review FSR and PSEIA as submitted to the DFFE.

The FSR presented and assessed the initial proposed Solar SEF layout and associated infrastructures of the Boshoek SEF 1 and its associated infrastructure. In May 2024, the DFFE accepted the FSR. The results of the specialists' scoping assessments, DFFE comments on the FSR, and other technical and financial constraints for the proposed development site were taken into consideration.

This EIA report presented and assessed a revised mitigated layout for the proposed development and has been made available for a prescribed 30-day consultation period. The comments received has been considered and incorporated as applicable into a Final EIA report. Once the Final EIA report has been submitted, the DFFE will make a decision within 107 days on whether to grant or refuse EA. I&APs will be notified of the availability of the Final EIA report for their review as per the FSR.

4.1 DFFE ENVIRONMENTAL SCREENING TOOL

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16 (1)(b)(v) of the EIA Regulations, 2014 (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of Basic Assessment (BA) and EIA applications in terms of Regulation 19 and 21 of EIA Regulations, 2014 (as amended). The Screening Report generated for the proposed development is included in Volume II of this Report.

The screening report was generated based on the selected classification, i.e., Infrastructure | Electricity | Generation | Renewable | Solar | PV. No intersections with Environmental Management Frameworks (EMF) were found. In terms of development incentives, restrictions, exclusions or prohibitions, no intersections with any development zones were found.

Based on the selected classification to produce the screening tool report, and the environmental sensitivities of the development footprint, the screening report generates a list of specialist assessments identified for inclusion in the assessment report. It is the responsibility of the EAP

to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study.

Table 4-1 provides a summary of the specialist assessments identified by the screening tool reports, and the response to each assessment in terms of the proposed development.

Specialist assessments undertaken (Volume II) have considered the results of the DFFE Screening Tool in their terms of reference.

TABLE 4-1 SPECIALIST ASSESSMENTS IDENTIFIED IN TERMS OF THE NATIONAL WEB-BASED SCREENING TOOL FOR THE BOSHOEK SOLAR 1

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
Agriculture Theme	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 MW or more, gazetted on 20 March 2020. This protocol replaces the requirements of Appendix 6 of the Environmental Impact Assessment Regulations.	High Sensitivity	Medium Sensitivity
	Comment: The agricultural sensitivity of the site, as identified by the screening tool ranges from medium to high agricultural sensitivity. The specialist assessment disputes the classified land capability, based on the assessment in this report that the site is unsuitable for viable rain-fed crop production. The specialist assessment therefore rates the entire proposed PV development area as being of medium agricultural sensitivity with a maximum land capability of 7.		
Landscape / Visual Theme	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	High Sensitivity	Medium Sensitivity
	Comment: The Screening Tool reports showed areas of low and moderate sensitivity for both development areas. This coincided with the information obtained from Google Earth, and the site visit. The tool for the overhead line		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	did not have a landscape theme sensitivity map, however, it identified sensitivities as being medium to low in the plant species theme		
Archaeological and Cultural Heritage Theme	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	Low Sensitivity	Low Sensitivity
	Comment: The low rating as provided by the Environmental Screening Tool has been confirmed by the field work, during which no significant archaeological or cultural heritage resources were identified.		
Paleontology Theme	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	High Sensitivity	Low Sensitivity
	Comment: 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 for the solar facilities is rare. This is in contrast with the High Sensitivity allocated to the development area by the SAHRIS Paleosensitivity Map and DFFE Screening Tool.		
Terrestrial Biodiversity Theme	Protocol for the Specialist Assessment and minimum report content requirements for Environmental Impacts on Terrestrial Biodiversity, gazetted on 20 March 2020.	Very High Sensitivity	Medium Sensitivity
	Comment: Boshoek Solar 1 SEF is classified as a Very High Sensitive area by the screening tool based on the fact that a very small portion of the project site (along the eastern boundary of the project site) falls within a NPAES Focus Area.). In terms of this small area being classified as a NPAES Focus Area, this is rather due to an error that		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	occurred during the processing of the spatial data used to generate the Focus Area map. This Focus Area is associated with the adjacent property to the east but has slightly extended to areas outside of this property. However, none the less, a loss of an area this small will not have any bearing on future conservation targets and thus the loss of this area is deemed acceptable.		
Aquatic Biodiversity Theme	Protocol for the Specialist Assessment and minimum report content requirements for Environmental Impacts on Aquatic Biodiversity, gazetted on 20 March 2020.	Low Sensitivity	Low Sensitivity
	Comment: During the site visit, it was confirmed that no natural aquatic/wetland features were located within the proposed development site as well as the potential area of influence for aquatic biodiversity (Aquatic PAOI). Subsequently it was confirmed that the PAOI are indeed of low sensitivity in terms of aquatic biodiversity and no further site investigation/study will be required during the EIA phase.		
Avian Theme	Protocol for the specialist assessment and minimum report content requirements for the Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).	Low Sensitivity	Medium - Low Sensitivity
	Comment: The avifauna SEI for the proposed Boshoek Solar 1 SEF was determined to be Medium and Low depending on the habitat. Additionally, the specialist is generally aligned with the Screening Tool finding for the Avian Theme which designates the site as Low sensitivity.		
Civil Aviation Theme	Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Civil Aviation Installations, gazetted on 20 March 2020.	Low Sensitivity	Low Sensitivity

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	Comment: Site verification confirms the low sensitivity as there are no major types of civil aviation aerodromes.		
Defence Theme	Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Defence Installations, gazetted on 20 March 2020.	Low Sensitivity	Low Sensitivity
	Comment: Site verification confirms the low sensitivity. During the public consultation, the South African National Defence Force (SANDF) will continue to be consulted by the EAP / Project Applicant to confirm that there will be no impact on the defence installation of the development area and immediate surrounds.		
Radio Frequency Interference (RFI) Theme	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	Low Sensitivity	Low Sensitivity
	Comment: Site verification confirms the low sensitivity. During the public consultation, the South African Radio Astronomy Observatory (SARAO) will be consulted by the EAP / Project Applicant to confirm that there will be no impact on the Radio Frequency Interference (RFI) within the immediate surrounds of the development. A site sensitivity verification report has been produced by the EAP for inclusion as part of the EIA process.		
Geotechnical Theme	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	Not Determined.	Not Determined.
	Comment: Geotechnical assessment was identified as a required specialist assessment, but no environmental sensitivity was determined by the screening report. The EAP is of the opinion that a Geotechnical Assessment for the		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	development can and will only be undertaken prior to the commencement of the construction phase. The EAP has not included this assessment as part of the application process.		
Plant Species Theme	Protocol for specialist assessment and minimum report content requirements for Environmental Impacts on Terrestrial Plant Species, gazetted on 20 March 2020.	Medium Sensitivity	Medium Sensitivity
	Comment: The screening report revealed the potential presence (Medium Sensitive) of one plant SCC namely: Cullen holubi; however, the species was not confirmed during the site visit. Based on the fact that suitable habitat has been confirmed (sandy-loam soils) within the Savanna Shrubland), this area is regarded as more suitable habitat and subsequently there is a Moderate Likelihood of Occurrence within this habitat. As such, all other habitat types can be downgraded to Low Sensitive whilst the two mentioned natural habitats should remain as Medium Sensitive.		
Animal Species Theme	Protocol for specialist assessment and minimum report content requirements for Environmental Impacts on Terrestrial Animal Species, gazetted on 20 March 2020.	High Sensitivity	Medium Sensitivity
	Comment: Based on findings of a desktop and in-field survey of the property the, all faunal habitats, apart from the Moderately Modified Thornveld (now displaying more as a Savanna Shrubland), can be regarded as of Low Sensitivity. The Savanna Shrubland should, however, be regarded as Medium Sensitivity as this area may potentially provide some habitat for SCC.		
Socio-Economic Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	Not Determined.	Not Determined.
	Comment:		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	Socio-economic assessment was identified as a required specialist assessment, but no environmental sensitivity was determined by the screening report. A full Social Impact Assessment has been undertaken by a social specialist, during the EIA process.		
Traffic Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	Not Determined	Low Sensitivity
	Comment: Traffic assessment was identified as a required specialist assessment, but no environmental sensitivity was determined by the screening report. A desk-based traffic assessment was undertaken for the proposed development as well as a site visit. The outcome of the specialist assessment confirms that the current farming activity and the environmental sensitivity of the proposed Solar SEF, from a traffic and transportation perspective is low.		

4.2 SPECIALIST METHODOLOGY

To evaluate the potential environmental impacts, information relating to the existing environmental conditions were collected through field and desktop research; this is known as the baseline. Climate change is expected to affect the proposed development site over the lifetime of the proposed development; however, the nature, scale and severity of climate change effects are uncertain. Given this uncertainty, the existing environment is assumed to remain constant throughout the lifetime of the proposed development, and forms the current and future baseline for the impact assessments.

4.2.1 SOILS, LAND USE AND AGRICULTURAL POTENTIAL

The assessment was based on an on-site investigation of the soils and agricultural conditions and was also informed by existing climate, soil and agricultural potential data for the site (see references). The aim of the on-site assessment was to:

- Ground-truth cropland status and consequent agricultural sensitivity; and
- Gain an understanding of overall agricultural production potential across the site.

The site investigation was conducted on 27 July 2023. An interview was also conducted with the farmer for information on farming practices on the site. Soils were assessed based on the investigation of existing soil exposures in combination with indications of the surface conditions and topography, and strategically positioned auger samples where necessary. Soils were classified according to the South African soil classification system (Soil Classification Working Group, 1991).

An assessment of soils and long-term agricultural potential is in no way affected by the season in which the assessment is made, and therefore the fact that the assessment was done in winter has no bearing on its results. The level of agricultural assessment is considered entirely adequate for an understanding of on-site agricultural production potential for the purposes of this assessment.

Based on the specialists' verification of the site as 'medium' sensitivity, the level of agricultural assessment followed by the specialist was an Agricultural Compliance Statement.

4.2.2 FRESHWATER AND WETLANDS (AQUATICS)

The delineation and classification of freshwater resources were conducted using the standards and guidelines produced by the DWS (DWAF, 2005 & 2007) and the South African National Biodiversity Institute (SANBI, 2009).

In addition to these guidelines, the general approach to freshwater habitat assessment was furthermore based on the proposed framework for wetland assessment as proposed within the Water Research Commission's (WRC) report titled: "Development of a decision-support framework for wetland assessment in South Africa and a Decision-Support Protocol for the rapid assessment of wetland ecological condition" (Ollis et. al., 2014).

The assessment was initiated with a survey of the pertinent literature, past reports and the various conservation plans that exist for the study region. The desktop delineation of all freshwater resources (rivers / streams and wetlands) within (DWS regulated area) of the proposed project site was undertaken by analysing available 10m contour lines and colour aerial

photography supplemented by Google Earth imagery where more up-to-date imagery was needed. Digitization and mapping were undertaken using ArcGIS software.

All the mapped freshwater resources were then broadly subdivided into distinct resource units (i.e., classified as either riverine or wetland systems / habitat). This was undertaken based on aerial photographic analysis and professional experience in working in the region.

During the site visit, it was confirmed that no natural aquatic/wetland features were located within the proposed development. Subsequently it was confirmed that the PAOI are indeed of low sensitivity in terms of aquatic biodiversity and no further site investigation/study will be required during the EIA phase.

4.2.3 TERRESTRIAL ECOLOGY (FLORA AND FAUNA)

4.2.3.1 ASSESSMENT APPROACH AND PHILOSOPHY

This terrestrial biodiversity assessment and report has been undertaken as per the requirements of the 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, 1998, when applying for environmental authorisation (GN 320, 20 March 2020). It also follows the most up to date *Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa* (South African National Biodiversity Institute, 2020), as well as the *Ecosystem Environmental Assessment Guideline: Draft* (http://opus.sanbi.org/jspui/handle/20.500.12143/7624).

The assessment was furthermore conducted according to the 2014 EIA Regulations, as amended on 7 April 2017.

This includes adherence to the following broad principles:

- That a precautionary and risk-averse approach be adopted towards projects which may result in substantial detrimental impacts on biodiversity and ecosystems, especially the irreversible loss of habitat and ecological functioning in threatened ecosystems or designated sensitive areas, namely: Critical Biodiversity Areas (as identified by systematic conservation plans, Biodiversity Sector Plans, or Bioregional Plans) and Freshwater Ecosystem Priority Areas.
- Demonstrate how the proponent intends on complying with the principles contained in section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), which, amongst other things, indicates that environmental management should, in order of priority, aim to:
    - Avoid, minimise, or remedy disturbance of ecosystems and loss of biodiversity;
    - Avoid environmental degradation;
    - Avoid jeopardising ecosystem integrity;
    - Pursue the best practical environmental option by means of integrated environmental management;
    - Protect the environment as the people's common heritage;
    - Control and minimise environmental damage; and
    - Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic, or stressed ecosystems.

These principles serve as guidelines for all decision-making concerning matters that may affect the environment. As such, it is incumbent upon the proponent(s) to show how proposed activities would comply with these principles and thereby contribute towards the achievement of sustainable development as defined by NEMA.

To adhere to the above principles and best-practice guidelines, the basis for the study approach and assessment philosophy included baseline data collection, desktop studies, and site walkovers/field surveys of the property, describing:

The broad botanical characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.

In terms of patterns, the following were studied:

Community and ecosystem level:

- The main vegetation types and plant communities (Dayaram et al., 2018; Mucina and Rutherford, 2006), their aerial extents, and interaction with neighbouring types, soils, or topography; and
- Threatened or Vulnerable ecosystems (cf. new South African vegetation map/National Spatial Biodiversity Assessment1, fine-scale systematic conservation plans, etc.) (South African National Biodiversity Institute, 2019).

Species-level:

- SCC: Red List and protected species, giving GPS location, if possible (Raimondo et al., 2009);
- Estimated population sizes and viabilities of SCC present on site (including, if possible, the degree of confidence in prediction based on availability of information and specialist knowledge; i.e., High = 70 – 100% confident, Medium = 40 – 70% confident, Low = 0 – 40% confident); and
- Probability of other SCC occurring in the region of the site (include degree of confidence).

Other pattern issues:

Any significant landscape features, or rare or important vegetation associations, such as seasonal wetlands, alluviums, seeps, sandstone outcroppings, steep southern aspects, drainage lines, etc., in the vicinity.

The extent of alien plant cover within the site, and whether any infestations are the result of prior disturbance, for example ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than an infestation of undisturbed sites).

The condition of the site in terms of current or previous land uses.

In terms of process, the following were studied:

- The key ecological “drivers” of ecosystems in the study area and its vicinity;
- Any mapped spatial components of ecological processes that may occur in the study area or its vicinity (i.e., corridors such as watercourses, upland-lowland gradients, migration routes, coastal linkages or inland-trending dunes, and vegetation boundaries such as edaphic interfaces, upland-lowland interfaces, or biome boundaries);

- Any possible changes in key processes e.g., increased fire frequency or drainage/artificial recharge of aquatic systems;
- If any further studies may be required during or after the EIA process, they will be outlined, together with all relevant legislation, permits, and standards that would apply to the development; and

The opportunities and constraints for development is described and shown graphically on an aerial photograph, satellite image, or map delineated at an appropriate level of spatial accuracy.

4.2.3.2 DATA EXPLORATION AND REVIEW

Data sources from the literature and GIS spatial information were consulted and used where necessary and included: Vegetation, Ecosystem and Fauna.

4.2.3.3 FLORA METHOD

The survey periods occurred from 27th March 2023 (early autumn) and from the 25th to 26th of January 2024 (summer). During the site visits the vegetation was in optimal survey conditions and the majority of plants were easily identifiable. According to the Botanical Research and Herbarium Management System (BRAHMS) online database, the optimal botanical survey period for the savanna biome is between October and April and may even slightly extend into May and as such these surveys occurred within the suggested optimal survey period and the current condition of the vegetation surveyed did not pose a limitation that would influence the outcome of this study.

Surveying was done within specifically targeted areas that were perceived as ecologically distinct and/or sensitive based on the results obtained from the desktop assessment of plant community types. This was to optimize coverage and to perform a rapid, but efficient, vegetation and ecological assessment at each survey area.

The botanical assessment was conducted by surveying fixed-point plots of sufficient size within each community type, which were also supplemented with timed meanders within the respective community types. The combination of single fixed-point plots, supplemented with timed random meanders, are highly efficient for conducting floristic analyses. This allows plant species coverages and SCC occurrences to be rapidly estimated, as well as the compilation of adequate plant species lists, thereby giving a prompt indication of botanical diversity. Other useful observations were also recorded within each community type, examples of which include ecological condition and current impacts (examples of which could include the presence of invasive alien plant species, livestock grazing, degree of erosion, etc.), general vegetation density and physiognomic characteristics, habitat notes, and the presence of any sensitive features (e.g., wetlands, seepages, and drainage lines) where applicable. Finally, any opportunistic observations were also made while surveying.

The inspection was conducted by a combination of vehicle surveying (with regular stops) and walking to assess the plant communities present. A Garmin® GPS was used to log any special features, SCC, or other important observations. All plants observed at the various stops were recorded, with attention given to observing the potential presence of SCC.

The aims were to:

- Inspect the various habitats, vegetation, and landscapes present at the study area, and to correlate such observations with the results of the desktop study;
- Identify all observed species recorded within the study area;

- Provide a list of SSC; and
- Note the presence of sensitive habitats, for example drainage lines and unique edaphic environments.

4.2.3.4 FAUNA METHOD

The survey periods occurred from 27th March 2023 (early autumn) and from the 25th to 26th of January 2024 (summer). Conditions for the faunal survey were regarded as acceptable.

For faunal habitat surveying, surveys were done within specifically targeted areas that were perceived as ecologically distinct and/or sensitive based on the results obtained from the desktop assessment of plant community and distinct landscape/geomorphological types. This was to optimize coverage and to perform a rapid, but efficient, faunal habitat and ecological assessment at each survey area.

Likelihood of Occurrence

There is a high likelihood that not all mammal species known to occur within the study area and surrounding areas will be located during the survey. Therefore, a 'Likelihood of Occurrence' (LOO) and a SCC review was applied to any potential omissions in the data set. For the LOO analysis, a full summary of Red List mammals (IUCN, 2017), as well as other SCC was tabulated, with a LOO applied. The relevant species of special consideration were addressed separately based on the data collected during fieldwork, in the context of development and the effects on the species (both ecologically and spatially).

LOO are based upon:

- Habitat suitability;
- Overlap with known distributions;
- Rarity of the species; and
- Current Impacts.

Spoor Tracking

Spoor tracking enabled detailed sampling of mammalian species without the need for trapping or direct observation. All spoor, including footprints, den sites, burrows, hairs, scrapings, and diggings were recorded and documented by detailed geo-referenced photography. Spoor tracking was performed during general fieldwork, during specific timed spoor tracking drives/transects, and at carefully chosen locations such as roads and other areas with highly trackable substrates. In addition, all camera trap sites were subjected to spoor tracking.

Scat (animal faecal matter) and Pellets (carnivore regurgitations)

Scats and pellets, namely those from small predators and owls, have proven highly efficacious for the identification of rodent populations inhabiting a designated research site. This methodology hinges upon the examination of intact or regurgitated jawbones, which are subsequently cross-referenced against established reference specimens housed at the University of Pretoria for precise species determination. Notably, this approach offers a valuable adjunct to traditional Sherman trapping methods. During routine fieldwork, a total of two jackal scats were opportunistically collected.

Direct Observations (Daytime)

All mammals observed during the sampling period, their geographic coordinates and the surrounding habitat were recorded. This data was used to supplement the overall habitat analysis to give context to the area. Animals were encountered through driving, normal routine movement through the study area and active searching of refugia.

Roadkill

All mammals observed dead on the roads were examined, geo-referenced and catalogued. Dead mammals were only recorded either on the farm itself or within major road arteries in the area of influence (i.e., R59)

4.2.3.5 HERPETOFAUNAL ASSESSMENT

Due to the limited time available for the field survey, no trapping was performed in order to maximise prime active searching time by eliminating the need to install, service, and dismantle the traps. Instead, the survey aimed to focus on intensive active searching.

Active Searching

Herpetofauna were searched for on foot within the study area. Specific habitat types were selected, beforehand, where active sampling was intentionally focused (point samples). The habitats of these point samples were also described and photographed. Active searching for reptiles occurred for approximately 30 minutes per point sample and involved:

- Photographing active reptiles from a distance with a telephoto lens (300 m telephoto lens);
- Lifting up and searching under debris, rocks, or logs (rocks and logs were always returned to their original positions);
- Scanning for any signs of reptiles such as shed skins, the positive identification of which was taken as an observation of that species; and
- Catching observed reptiles by hand. All captured reptiles were photographed and released unharmed.

For amphibian species, positive identification of acoustic signals (males call to attract females) was also used as a means of identifying amphibians.

Opportunistic Sampling

Reptiles, especially snakes, are incredibly elusive and difficult to observe. Consequently, all possible opportunities to observe reptiles were taken in order to augment the standard sampling procedures described above. As a result, other participating biodiversity specialists assisted through opportunistically taking photographs of reptiles and amphibians within the study area. These images were copied for proper identification and added to the list of random observations unless a specific location of the observation was provided.

SSC

SCC likely to occur in the various habitats of the study area were assessed at a desktop level using the outputs of Plants of Southern Africa (POSA) and iNaturalist. This information was used to identify potential habitats in the study area that could support these SCC. Special attention was given to the identification of any Threatened species, as well as suitable habitats for Threatened species, observed during field investigations.

Ecological Mapping

Mapping was done via available Google-Earth Satellite Imagery. Due to the intricate mosaics and often gradual mergers of vegetation units, generalisations were made and delineations are therefore approximate. Mapped units thus indicate potential dominant vegetation, but smaller vegetation types invariably exist within dominant units, and could not be mapped separately. The latter would require a supervised classification of georeferenced raw SPOT or similar satellite imagery (with full reflectance data), which was not available for this project due to a limited budget. Although supervised classification of georeferenced raw SPOT or similar satellite imagery was not conducted due to budget constraints, it's essential to highlight that the analysis and classification methods employed within this study maintain a high standard. The conducted analyses are comprehensive, detailed, and robust enough to yield informed findings, make sound decisions, and provide reliable recommendations. The absence of supervised classification does not compromise the quality or integrity of the study's outcomes. Maps were created with QGIS (version 3.20).

Terrestrial SEI

The most current site sensitivity methodology, namely SEI, was also followed here, as proposed by the *Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa* (South African National Biodiversity Institute, 2020).

The different plant community types within the study area were delineated and identified based on field observations and satellite imagery. These plant community types were assigned SEI categories based on various factors, such as ecological integrity, conservation value, functionality, ecosystem processes, and the presence/absence of SCC, among other things.

Specifically, SEI is a function of two factors:

- The Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/fauna community, or habitat type) and
- Receptor Resilience (RR; the resilience of the receptor to impacts).

BI is in turn a function of Conservation Importance (CI; the importance of a site for supporting biodiversity features of conservation concern that are present) and the Functional Integrity (FI; the receptors' current ability to maintain its structure and functions, compared to its known or predicted state under ideal conditions) of the receptor.

BI and SEI are both calculated using respective risk matrices. BI, FI, and RR categories are all circumscribed by various criteria. The various criteria per category may be applied in combination or in isolation. SEI is usually evaluated per plant community type / vegetation type.

4.2.4 AVIFAUNA

4.2.4.1 DESKTOP ASSESSMENT

A desktop assessment was principally undertaken using GIS to access the latest available spatial datasets to develop digital cartographs and species lists. These datasets and their date of publishing are provided below.

4.2.4.2 ECOLOGICAL IMPORTANT LANDSCAPE FEATURES

Existing ecologically relevant data layers were incorporated into GIS to establish how the proposed development might interact with any ecologically important entities.

4.2.4.3 EXPECTED AVIFAUNA SPECIES

The following resources were considered during the desktop assessment and for the compilation of the expected species list:

- South African Bird Atlas Project 2 (SABAP2). Full protocol data from 16 relevant pentads (2515_2655, 2515_2700, 2515_2705, 2520_2655, 2520_2700, 2520_2705, 2525_2655, 2525_2700, 2525_2705, 2525_2710, 2530_2655, 2530_2700, 2530_2705, 2530_2710, 2535_2705, 2535_2710) were used to compile the expected species list;
- Coordinated Water Bird Counts (CWAC) – The Animal Demography Unit (ADU) launched the Coordinated Waterbird Counts (CWAC) project in 1992 as part of South Africa's commitment to international waterbird conservation. The primary aim of CWAC is to act as an effective long-term waterbird monitoring tool. This is done through a programme of regular mid-summer and mid-winter censuses at several wetlands. The database is located at https://cwac.birdmap.africa/index.php;
- Coordinated Avifaunal Roadcounts (CAR) – The Coordinated Avifaunal Roadcounts (CAR) were pioneered in July 1993 in a joint Cape Bird Club/ADU project to monitor the populations of two threatened species: *Anthropoides paradiseus* (Blue Crane) and *Neotis denhamii* (Denham's Bustard). Presently it monitors 36 species of large terrestrial birds along 350 fixed routes covering over 19 000 km using a standardised method;
- Important Bird and Biodiversity Areas (BirdLife South Africa, 2022) – Important Bird and Biodiversity Areas (IBAs) constitute a global network of over 13 500 sites, of which 112 are found in South Africa. IBAs are sites of global significance for bird conservation, identified through multi-stakeholder processes using globally standardised, quantitative and scientifically agreed criteria;
- Hockey et al. (2005), Roberts Birds of Southern Africa (7th edition). The primary source for species identification, geographic range, and life history information;
- Sinclair and Ryan (2010), Birds of Africa South of the Sahara. Secondary source for identification; and
- Taylor et al. (2015), Eskom Red Data Book of Birds of South Africa, Lesotho, and Swaziland. Used for conservation status, nomenclature, and taxonomical ordering.

4.2.4.4 FIELD SURVEY

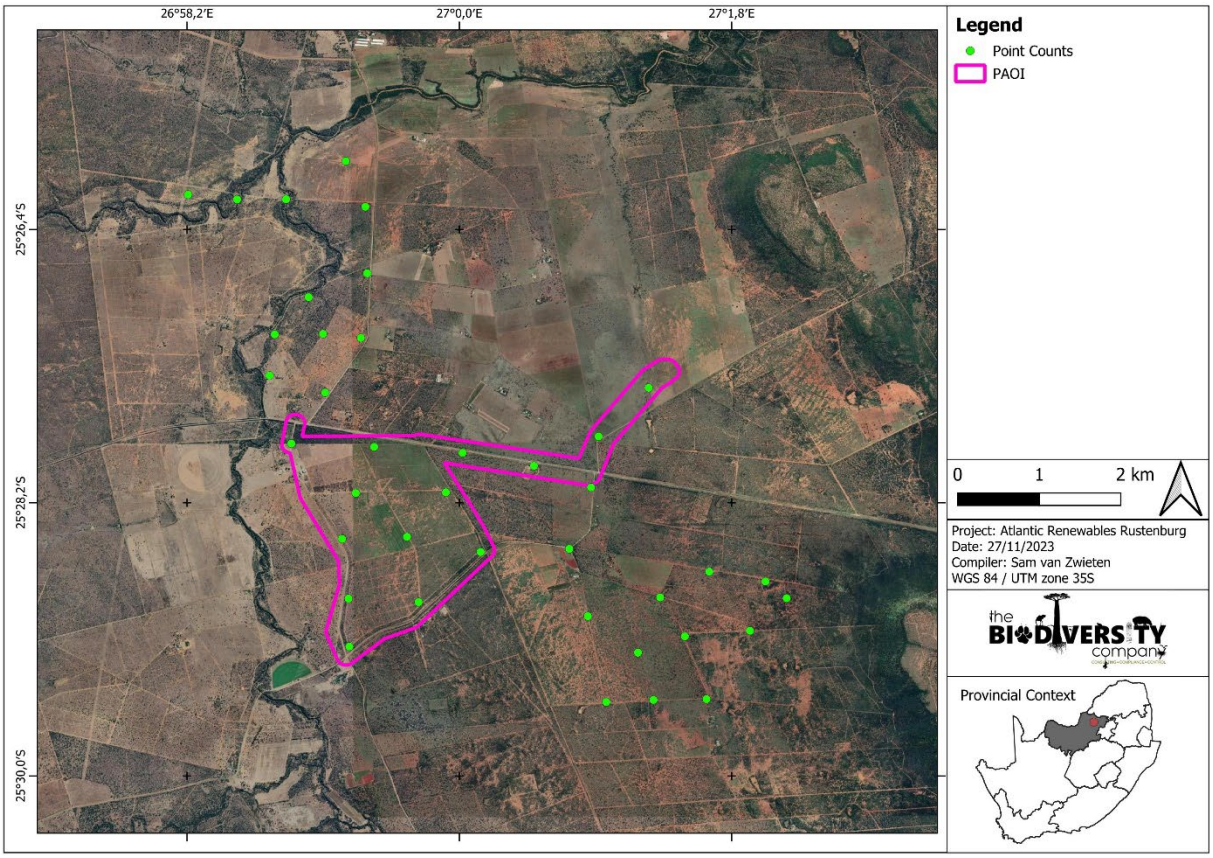
Two site visits were conducted for this regime 2 assessment in winter over the 9-11th of June 2023 and in spring over the 16-17th of September 2023. These site visits are considered sufficient from a seasonal perspective and require no additional season assessment. However, the data was compared to the following dataset listed in section 4.2 and no differences were observed, further suggesting that sufficient data sampling was conducted to better our understanding of the bird community in the area.

Sampling consisted of Standardised Point Counts as well as random diurnal incidental surveys. Standardised Point Counts (Buckland et al., 1993) were conducted to gather data on the species composition and relative abundance of species within the broad habitat types identified. The Standardized Point Count technique was utilised as it was demonstrated to outperform line routes

(Cumming & Henry, 2019). Each point count was run over 10 minutes. The horizontal detection limit was set at 150 m. At each point, the observer would document the date, start time, and end time, habitat, numbers of each species, detection method (seen or heard), behaviour (perched or flying) and general notes on habitat and nesting suitability for conservation important species.

Diurnal and nocturnal incidental searches were conducted to supplement the species inventory with cryptic and elusive species that may not be detected during the rigid point count protocol. This involved opportunistic species sampling between point count periods, random meandering and road cruising. An effort was made to cover all the different habitat types within the limits of time and access.

FIGURE 4-1 MAP ILLUSTRATING THE FIELD SURVEY AREA AND LOCATIONS OF STANDARDISED POINT COUNTS USED FOR THE ANALYSIS IN THIS REPORT



4.2.4.5 DATA ANALYSIS

The analyses described below only used the data collected from the Standardised Point Counts for this proposed project. Raw count data were converted to relative abundance values and used to establish dominant species and calculate the diversity of each habitat. Present and potentially occurring species were assigned to 13 major trophic guilds loosely based on the classification system developed by González-Salazar et al. (2014). Species were first classified by their dominant diet (carnivore, herbivore, granivore, frugivore, nectarivore, omnivore), then by the medium upon/within which they most frequently forage (ground, water, foliage, air) and lastly by their activity period (nocturnal or diurnal).

4.2.4.6 SITE ECOLOGICAL IMPORTANCE (SEI)

The habitat types within the project area were delineated and identified based on observations during the field assessment and available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern and their ecosystem processes.

SEI is a function of the BI of the receptor (e.g., SCC, the vegetation/fauna community or habitat type present on the site) and Receptor Resilience (RR) (its resilience to impacts).

BI is a function of CI and the Functional Integrity (FI) of the receptor.

4.2.5 HERITAGE, ARCHAEOLOGY AND PALEONTOLOGY

A survey of available literature was carried out to assess the general heritage context into which the development would be set. Data was also collected via a field survey by two archaeologists subjected to a detailed foot survey between 21 - 25 August 2023.

The HIA process consists of three steps:

- Step I – Literature Review and initial site analysis: The background information to the field survey relies greatly on the Heritage Background Research which was undertaken through archival research and evaluation of satellite imagery and topographical maps of the study area;
- Step II – Physical Survey: A physical survey was conducted by a combination of vehicle and pedestrian access through the proposed project area by two qualified archaeologists (between 21 and 25 August 2023), aimed at locating and documenting sites falling within and adjacent to the proposed development footprint; and
- Step III – The final step involved the recording and documentation of relevant heritage resources identified in the physical survey, the assessment of these resources in terms of the HIA criteria and report writing, as well as mapping to provide demarcated sensitivity areas for the developer to consider during project planning and the evaluation in the EIA phase of the project.

The study included desktop and field-based paleontological heritage study based on information resources and the specialist expertise. Minimum standards for the paleontological component of heritage impact assessment reports (PIAs) have recently been published by SAHRA (2013) and Heritage Western Cape (2021) and has been considered for the development of the study.

During a site investigation the paleontologist does not only survey the development but also determines the density and diversity of fossils in the development area. This is confirmed by examining representative exposures of fossiliferous rocks (sedimentary rocks contain fossil heritage whereas igneous and metamorphic rocks are mostly unfossiliferous).

Rock exposures that are investigated usually contains a large portion of the stratigraphic unit, can be accessed easily and comprise of unweathered (fresh) exposed rock. These exposures may be natural (rocky outcrops in stream or riverbanks, cliffs, dongas) but could also be artificial (quarries, open building excavations and even railway and road cuttings). It is common practice for paleontologists to log well-preserved fossils (GPS, and stratigraphic data) during field assessment studies.

4.2.6 VISUAL/LANDSCAPE

- Site visit: The field survey was undertaken on 22 and 23 August 2023;

- Project components: The physical characteristics of the project components are described and illustrated based on information supplied by the EAP;
- The landscape's character is described and rated in terms of its aesthetic appeal using recognised contemporary research in perceptual psychology as the basis, and its sensitivity as a landscape receptor;
- The sense of place of the study area is described as to its uniqueness and distinctiveness. The primary informant of these qualities is the spatial form and character of the natural landscape together with the cultural transformations associated with the historical/current use of the land;
- The visibility of the proposed Project was determined using on-site observations (viewshed modelling will be done in the Assessment Phase); and
- The potential visual impact (high level) of the proposed Project is rated based on a professional opinion, the method described above and the risk analysis criteria.

4.2.7 SOCIO-ECONOMIC

The approach to the Scoping Level Social Impact Assessment (SIA) study is based on the current social setting within which Boshoek Solar 1 SEF is proposed.

The process of undertaking the social impact assessment for this project comprised the following:

- Collection and review of existing information, including national, provincial, district, and local plans, policies, programmes, census data, and available literature from previous studies conducted within the area. Project specific information was obtained from the project proponent;
- Collection of Primary data through site visits and interviews with local I&APs; and
- Identification and assessment of potential direct, indirect, and cumulative impacts likely to be associated with the construction and operation of the proposed project. Impacts associated with construction can also be expected to be associated with the decommissioning phase (however, to a lesser extent as the project site would have previously undergone transformation and disturbance during construction).

Impacts likely to be induced by the proposed development have been identified taking into consideration other specialists findings undertaken as part of the EIA process, similar projects and specialists' knowledge and experience. Indirect impacts (cumulative) likely to be induced by the identified proposed development impacts have also been included in the report, including impacts likely to emanate because of the potential no-development option.

The impact rating was undertaken using a matrix selection process, the most used methodology, for determining the significance of potential impacts/risks. This methodology takes into account two aspects for assessing the potential significance of impacts, namely occurrence and severity, which are further sub-divided into further categories.

4.2.8 TRAFFIC AND TRANSPORTATION

The expected traffic and transport impact during the Construction Phase, Operation Phase and Decommissioning Phase of the proposed Solar PV Facility were assessed.

The requirements in the TMH 16 Vol 1 & 2 South African Traffic Impact and Site Traffic Assessment Manual, August 2012, compiled by the Committee of Transport Officials (COTO) were used for this study.

The requirements as per EIA Regulations of 4 December 2014, as amended by GNR 326 on 7 April 2017, Appendix 6, are adhered to.

Trip generation rates were based on the Scope of Work and an anticipated construction programme.

A site visit was conducted on 11th, 12th and 13th September 2023 to assess the routes providing access to the site and to gain insight to possible issues and constraints along the local road network / various routes surrounding the site.

The National Road network and high order arterials (R565) that form part of the abnormal road network are assumed to be used for long distance equipment deliveries to site with abnormal loads being transported under permit to be obtained by the abnormal load transport carrier.

Traffic impacts resulting from other similar developments within 35 km of the site were estimated, based on previous experience of similar developments, and understanding of their cumulative impact on traffic and road network associated with the subject Solar PV Facility.

The Impact Assessment Methodology assists in evaluating the overall effect of a proposed activity on the environment. The environmental impact is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts is undertaken through an assessment of the significance of the impacts.

4.3IDENTIFICATION OF POTENTIAL IMPACTS

The identification of potential impacts covers the three phases of the proposed development: construction, operation and decommissioning. During each phase, the potential environmental impacts may be different. For example, during the construction phase, traffic volumes are far greater than during the operational life of a SEF.

The project team has experience from environmental studies for other projects in the locality of the proposed development. The team is, therefore, able to identify potential impacts addressed in the EIA based on their experience and knowledge of the type of development proposed and the local area. Their inputs inform the scope for the S&EIA process.

Each specialist assessment considered:

- The extent of the impact (local, regional or (inter) national);
- The intensity of the impact (low, medium or high);
- The duration of the impact and its reversibility;
- The probability of the impact occurring (improbable, possible, probable or definite);
- The confidence in the assessment; and
- Cumulative impacts.

Following identification of potential environmental impacts, the baseline information was used to predict changes to existing conditions and undertake an assessment of the impacts associated with these changes.

4.3.1 ASSESSMENT OF POTENTIAL IMPACTS

The potential impact that the proposed development may have on each environmental receptor could be influenced by a combination of the sensitivity or importance of the receptor and the predicted degree of alteration from the baseline state (either beneficial or adverse).

Environmental sensitivity (or importance) may be categorised by a multitude of factors, such as the rarity of the species; transformation of natural landscapes or changes to soil quality and land use. The overall significance of a potential environmental impact is determined by the interaction of the above two factors (i.e., sensitivity/importance and predicted degree of alteration from the baseline).

The potential impact that the proposed development may have on each environmental receptor could be influenced by a combination of the sensitivity and importance of the receptor and the predicted degree of alteration from the baseline state (either beneficial or adverse).

Environmental sensitivity (and importance) may be categorised by a multitude of factors, such as the rarity of the species; transformation of natural landscapes or changes to soil quality and land use.

The overall significance of a potential environmental impact is determined by the interaction of the above two factors (i.e., sensitivity/importance and predicted degree of alteration from the baseline).

Specialists, in their terms of references, were supplied with a standard method with which to determine the significance of impacts to ensure objective assessment and evaluation, while enabling easier multidisciplinary decision-making. The methodology[1] as outlined below indicates the categories for the rating of impact magnitude and significance.

The assessment methodology that was used is in accordance with the EIA Regulations, 2014 (as amended). The significance of environmental impacts is a function of the environmental aspects that are present and to be impacted on, the probability of an impact occurring and the consequence of such an impact occurring before and after implementation of proposed mitigation measures.

Extent (special scale)

L	M	H
Impact is localised within site boundary	Widespread impact beyond site boundary; Local	Impact widespread far beyond site boundary; Regional/national

Duration

L	M	H
Quickly reversible, less than project life, short term	Reversible over time; medium-term to life of project	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

Intensity

[1] Adapted from T Hacking, AATS – Envirolink, 1998: An innovative approach to structuring environmental impact assessment reports. In: IAIA SA 1998 Conference Papers and Notes.

Type of Criteria	Negative			Positive		
	H-	M-	L-	L+	M+	H+
Qualitative	Substantial deterioration death, illness or injury, loss of habitat /diversity or resource, severe alteration or disturbance of important processes.	Moderate deterioration, discomfort, Partial loss of habitat /biodiversity /resource or slight or alteration	Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration.	Minor improvement, restoration, improved management	Moderate improvement, restoration, improved management, substitution	Substantial improvement, substitution
Quantitative	Measurable deterioration Recommended level will often be violated (e.g., pollution)	Measurable deterioration Recommended level will occasionally be violated	No measurable change; Recommended level will never be violated	No measurable change; Within or better than recommended level.	Measurable improvement	Measurable improvement

Probability of Occurrence

L	M	H
Unlikely; low likelihood; Seldom No known risk or vulnerability to natural or induced hazards.	Possible, distinct possibility, frequent Low to medium risk or vulnerability to natural or induced hazards.	Definite (regardless of prevention measures), highly likely, continuous High risk or vulnerability to natural or induced hazards.

Status of the Impact

The specialist described whether the impact is positive, negative or neutral for each parameter. The ranking criteria are described in negative terms. Where positive impacts are identified, the opposite, positive descriptions for criteria had been used.

Degree of Confidence in Predictions

The degree of confidence in the predictions, based on the availability of information and specialist knowledge, had been stated.

Consequence: (Duration x Extent x Intensity)

Having ranked the severity, duration and spatial extent, the overall consequence of impacts is determined using the following qualitative guidelines:

Intensity = L

Duration				
	H			
	M			Medium
	L	Low		

Intensity = M

Duration				
	H			High
	M		Medium	
	L	Low		

Intensity = H

Duration				
	H			
	M			High
	L	Medium		
		L	**M**	**H**
		Extent		

Positive impacts are ranked in the same way as negative impacts but result in high, medium or low positive consequence.

Overall significance of impacts

Combining the consequence of the impact and the probability of occurrence provides the overall significance (risk) of impacts.

PROBABILITY	**Definite Continuous**	**H**	**MEDIUM**		**HIGH**
	Possible Frequent	M	MEDIUM		
	Unlikely Seldom	L	LOW		MEDIUM
			L	M	H
			CONSEQUENCE		

Mitigation Measures

Measures to avoid, reduce or remedy significant adverse impacts identified, are termed mitigation measures. Where the assessment process identifies any significant adverse impacts, mitigation measures are proposed to reduce those impacts where practicable. Such measures include the physical design and operational measures. Design alterations such as the route of the servitude to avoid certain sensitive receptors are mitigation embedded into the design of the proposed development, i.e., embedded mitigation.

This strategy of avoidance, reduction and remediation is a hierarchical one which seeks:

- First to avoid potential impacts;
- Then to reduce those which remain; and
- Lastly, where no other measures are possible, to propose compensatory measures.

Each specialist consultant identified appropriate mitigation measures (where relevant).

4.3.2 MITIGATION

The EIA proposes measures to avoid, reduce or remedy significant adverse impacts which were identified; these are termed mitigation measures. Where the assessment process identified any significant adverse impacts, mitigation measures were proposed to reduce those impacts where practicable. Such measures include the physical design evolutions such as movement of turbines and management and operational measures. Design alterations such as relocating turbines to avoid certain sensitive receptors are mitigation embedded into the design of the proposed development, i.e., embedded mitigation.

This strategy of avoidance, reduction and remediation is a hierarchical one which seeks:

First to avoid potential impacts;

- Then to reduce those which remain; and
- Lastly, where no other measures are possible, to propose compensatory measures.

Each specialist consultant identified appropriate mitigation and enhancement measures (where relevant).

4.3.3 CUMULATIVE IMPACT ASSESSMENT

In accordance with the EIA Regulations, consideration is also given to 'cumulative impacts'.

Cumulative impacts are those that result from incremental changes caused by past, present or reasonably foreseeable future actions together with the proposed development. Cumulative impacts are the combined impacts of several developments that are different to the impacts from the developments on an individual basis. For example, the landscape impact of one SEF may be insignificant, but when combined with another it may become significant.

For this assessment cumulative impacts are defined and will be assessed in the future baseline scenario, i.e., cumulative impact of the proposed development = change caused by proposed development when added to the cumulative baseline. The cumulative baseline includes all other identified developments. In the cumulative assessment the effect of adding the proposed development to the cumulative baseline is assessed.

In line with best practice, the scope of this assessment was to include all operational, approved or current and planned renewable energy applications (including those sites under appeal), within a 35 – 50 km radius of the site. Therefore, all potential projects are included, even though it is unknown how many of these will be constructed.

Renewable energy sites included for cumulative impact assessment are based on the knowledge and status of the surrounding areas at the time of the specialists compiling their assessments, these will be updated as applicable through the EIA process.

A preliminary assessment of cumulative impacts was made in the Scoping Phase and has been assessed further in this EIA Phase (refer to Section 11).

5. NEED AND DESIRABILITY

Reference is made to the DFFE 2017 Guideline on Need and Desirability which states that while the "concept of need and desirability relates to the type of development being proposed, essentially, the concept of need and desirability can be explained in terms of the general meaning of its two components in which need refers to time and desirability to place – i.e. is this the right time and is it the right place for locating the type of land-use/activity being proposed? Need and desirability can be equated to wise use of land – i.e. the question of what is the most sustainable use of land."

The Need and Desirability of the proposed development has been considered in terms of the regional location and the project's cumulative impact. The guidelines pose questions that should be considered in this investigation, which are addressed in the Table 5-1 and Table 5-2 below.

TABLE 5-1 ECOLOGICAL CONSIDERATIONS OF NEED AND DESIRABILITY FOR THE BOSHOEK SEF 1

"securing ecological sustainable development and use of natural resources"[2]			
Question		Answer	Reference
How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?		With the effective implementation of the suggested mitigation and avoidance, it is unlikely that the development of the Boshoek SEF 1 would significantly compromise the long-term ecological integrity and associated ecosystems.	Volume II: Terrestrial Biodiversity Impact Assessment
How were the following ecological integrity considerations taken into account?	*Threatened Ecosystems*	There are no threatened ecosystems within the site, the entire project footprint overlaps with LC ecosystems according to RLE 2021 Spatial Data.	Volume II: Terrestrial Biodiversity Impact Assessment
	Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure	The aquatic report's assessment of the Present Ecological State (PES) focused on evaluating the health and integrity of river ecosystems by measuring their deviation from the reference state. This evaluation considered the concept of "habitat integrity," which involves maintaining a balanced composition of physical, chemical, and habitat characteristics comparable to natural habitats in the region. The Index of Habitat Integrity (IHI) was used as a measure of PES, covering both in-stream and riparian habitats. The assessment involved separate evaluations of habitat integrity for in-stream and riparian habitats, based on various indicators, including water abstraction, flow modification, inundation, bed modification, bank erosion, channel modification, water quality, solid waste disposal, vegetation removal, and exotic vegetation. In summary, the report's findings indicate that various watercourses and drainage lines within the study area exhibit different levels of modification, influenced by a range of natural and anthropogenic factors. Understanding these variations in habitat integrity and ecological state is essential for making informed decisions regarding conservation and management strategies for these ecosystems.	Volume II: Freshwater Resource Study and Assessment
	Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs")	There are no CBA1 (Critical Biodiversity Areas) or CBA2 aquatic features located in close proximity to the project site. However, a few ESA1 and ESA2 features have been mapped within the DWS regulated area.	Volume II: Terrestrial Biodiversity Impact Assessment

[2]Section 24 of The Constitution of South Africa refers.

"securing ecological sustainable development and use of natural resources"[2]			
		Furthermore, these ESAs are associated with the Selons River as well as small tributaries, with a very small portion of the Selons River included within the DWS Regulated Area, as well as three small tributaries. It is, however, very unlikely that the proposed development will directly impact these features. The CBA has been degraded and that it is recommended to be downgraded to an ESA.	
	Conservation targets	A very small portion of the project site (along the eastern boundary of the project site) falls within a NPAES Focus Area (0.086 ha or 0.03% of project site) (Figure 23). In terms of this small area being classified as a NPAES Focus Area, this is rather due to an error that occurred during the processing of the spatial data used to generate the Focus Area map. This Focus Area is associated with the adjacent property to the east but has slightly extended to areas outside of this property. However, none the less, a loss of an area this small will not have any bearing on future conservation targets and thus the loss of this area is deemed expectable.	Volume II: Terrestrial Biodiversity Impact Assessment
	Ecological drivers of the ecosystem	As the broader area is still largely intact, and most direct impacts are associated with the relatively short, transient, construction phase, cumulative impacts associated with the current project are considered low and acceptable. There do not appear to be any ecological processes or corridors that would be specifically disrupted by the Boshoek SEF 1. In addition, should all the planned projects in the area be built, the overall extent of habitat loss would not be significant relative to the overall extent of the affected vegetation types. As such, the contribution of the Boshoek SEF 1 to habitat loss would not change the overall threat status of any vegetation types or special habitats and the overall level of cumulative impact in the area is considered acceptable.	Volume II: Terrestrial Biodiversity Impact Assessment
	Environmental Management Framework	The proposed Boshoek 1 Solar PV complies with all policies and planning tools and has no intersections with EMFs or with any development zones according to the DFFE screening tool report.	n/a
	Spatial Development Framework	The main purpose of the Spatial Development Framework (SDF) is to guide the form and location of the future physical development within a Municipal Area. The SDF should be flexible and be able to change its priorities, whereas the Land Use Management System (LUMS) should be tighter and only amended where required for a particular development. The SDF should inform the content of the LUMS and does not act as a direct source of rights and control itself. In this regard, the SDF should:	Volume II: Social Impact Assessment

"securing ecological sustainable development and use of natural resources"[2]			
		• Act as a strategic, indicative and flexile forward planning tool to guide planning and decision on land development; • Develop a clear argument or approach for spatial development in the area of jurisdiction of the municipality; • Develop a spatial logic which guides private sector investments; • Ensure the social, economic, and environmental sustainability of the area; • Establishment priorities for public sector development and investment; and • Identify spatial development priorities and places. The purpose of the SDF is not to infringe upon existing land but to guide future land uses, and the maps should be used as a systematic representation of the desired spatial form to be achieved by the municipality. The review of relevant legislation, policies and documentation pertaining to the energy sector indicate that renewable or green energy (i.e. energy generated by naturally occurring renewable resources) and therefore the establishment of the Boshoek Solar 1 is supported at a national, provincial, and local level, and that the proposed project will contribute positively in a small way towards a number of targets and policy aims; specifically those relating to employment creation, social and economic development and upliftment, and an increase in renewable energy and electricity supply which has the potential to further improve individuals' standard of living.	
	Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.)	All global responsibilities to which South Africa is signatory or party to were assessed within this report. Applicable international treaties and conventions are: • UNFCCC Paris Agreement (2016); • The Equator Principles IIII (2020); • The Convention on Biological Diversity (CBD) (1993); • The Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention) (1983); and • The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) (1999) The proposed development complies with all international responsibilities.	n/a
How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were		The proposed development can disturb listed plant species and vegetation from clearing of the development footprint, soil erosion and alien plant invasion. Increased levels of pollution, noise, disturbance and	Volume I App B: EMPr Volume II:

"securing ecological sustainable development and use of natural resources"[2]		
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?	human presence can impact negatively on faunal communities. Biodiversity value and ecological functioning of the proposed development area are potentially affected by the development. As part of the EIA process specialist studies were conducted to identify areas most environmentally suitable for development within the proposed development site boundary. As a result of these studies a development layout has been produced that avoids sensitive areas and identified constraints. The specialists have proposed mitigation measures to further reduce residual risks or enhance opportunities during construction, operation and decommissioning phases of the development. With implementation of these mitigation measures, all identified negative impacts are expected to be reduced to acceptable levels of medium or low negative significance. All mitigation measures proposed by the specialists are included in the EMPr for the project.	Specialist reports
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?	On a national level the development will lessen the country's dependency on coal, and contribute to lowering water consumption, pollution and environmental degradation per kW of electricity produced. The EMPr provides measures for avoidance and minimisation of pollution, as well as enhancing any potential positive impacts.	Volume I App B: EMPr
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 generation of waste will largely be restricted to the construction phase of the project and consist of normal construction phase solid waste streams. The EMPr has detailed specific mitigation measures that must be implemented for the appropriate management and minimisation of waste, during all phases of the project. Registered service providers will be utilised to transport solid waste to registered landfills.	Volume I App B: EMPr
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?	Visual buffers are applied to cultural landscapes / heritage sites. The development layout is produced by avoiding turbine placement within these visual buffers. A Heritage Impact Assessment and a Visual Impact Assessment were conducted to assess the proposed layout. Comment from the relevant heritage authority will be sought. Mitigation measures have been identified by the heritage specialists to minimise and remedy residual impacts, and enhance positive impacts.	Volume II: Heritage Impact Assessment & Visual Impact Assessment

"securing ecological sustainable development and use of natural resources"[2]			
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?		Solar is a renewable resource and will be the 'fuel' for the SEF to generate electricity. Therefore, the development will have a minimal impact on non-renewable resources.	n/a
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		The SEF will use the renewable energy resource of solar to generate power. Construction of the SEF will require use of water, a renewable natural resource. Operation of the SEF will consume relatively small quantities of water when compared to alternative energy technologies such as coal. Impacts on the ecosystem caused by use of these renewable energy resources has been evaluated.	n/a
	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)	The proposed SEF will reduce South Africa's dependency on non-renewable resources, particularly coal, as an energy source. Solar as an energy source is not dependent on water, as compared to the massive water requirements of conventional power stations, has a limited footprint and does not impact on large tracts of land, and poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants.	n/a

"securing ecological sustainable development and use of natural resources"[2]			
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?	*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 this the proposed development alternative?)*	The current land use is low-intensity grazing and the land is not suitable for other agricultural uses. The proposed development will increase yield as the landowners will be paid for the use of their land. This will improve cash flow and financial sustainability of farming enterprises on site. The proposed development itself will not cause a significant change in land use, as the development site is primarily low intensity agriculture (grazing), which can still proceed once the development is constructed. Solar is a renewable resource and a Solar energy facility is the best use thereof.	Volume II: Agricultural Impact Assessment; Social Impact Assessment
	Do the proposed location, type and scale of development promote a reduced dependency on resources?	The proposed SEF is predicted to reduce dependency on coal as an energy source. Solar as an energy source is not dependent on water, as compared to the massive water requirements of conventional coal fired power stations, has a limited footprint and does not impact on large tracts of land, and poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants.	n/a
How were a risk-averse and cautious approach applied in terms of ecological impacts?	*What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?*	Although the solar farm area is large with the result that not all areas could be sampled in detail, the project footprint area is considered to have been well-covered and it is highly unlikely that there are any significant vegetation features present that would not have been observed during the study. Given the favourable conditions at the time of the site visits, there are few limitations and assumptions required with regards to the vegetation of the site and the presence of plant SCC within the wind farm development footprint. Several limitations and assumptions are also inherent in the study regarding the avifauna of the site including the following: • The proposed project area, and this was delineated to provide the Project Area of influence (PAOI). See section 2.1 of this report for additional details. Any alterations to the area and/or missing Geographic Information Systems (GIS) information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment; • Whilst every effort was made to cover as much of the PAOI as possible, it is possible that some species that are present within the	Volume II: Terrestrial Biodiversity Impact Assessment

"securing ecological sustainable development and use of natural resources"[2]			
		PAOI were not recorded during the field investigations due to their secretive behaviour; and • The GPS used in the assessment has an accuracy of 5 m, and consequently, any spatial features delineated may be offset by up to 5 m.	
	What is the level of risk associated with the limits of current knowledge?	The risk associated with assumptions and limits of current knowledge is the potential for information being assessed to be incorrect. This would translate to erroneous impact identification and mitigation measures. However, due to the amount of site work conducted the risk associated with this is considered to be low.	n/a
	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?	Information on plant and animal species recorded for the wider area was extracted from the South African Biodiversity Information Facility (SABIF)/ SANBI Integrated Biodiversity Information System (SIBIS) database hosted by the South African National Biodiversity Institute (SANBI). Data was extracted for a significantly larger area than the study area, but this is necessary to ensure a conservative approach as well as counter the fact that the site itself has not been well sampled in the past	Volume II: Terrestrial Biodiversity Impact Assessment
How will the ecological impacts resulting from this development impact on people's environmental right in terms following:	*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?*	Impacts on people's rights have been identified and assessed by the social specialist and visual specialist. The visual specialist impacts associated with the proposed Project are of a nature, scale and duration that will require mitigation to reduce the predicted impact from medium to low during the operational phase. the visual specialist believes that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended measures are effectively implemented and managed in the long term. The significance of the potential negative health risks posed by the development is expected to be low. The operational impact on the sense of place is expected to be of low negative significance with mitigation.	Volume II: Visual Impact Assessment; Social Impact Assessment; Noise Impact Assessment
	Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures	Renewable energy has fewer negative health effects than other forms of non-renewable energy generation and will have overall positive health benefits.	Volume II: Social Impact Assessment

"securing ecological sustainable development and use of natural resources"[2]			
	were taken to enhance positive impacts?		
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.)?		From a social perspective, it is concluded that the proposed project and its associated infrastructure is supported, but that mitigation measures should be implemented and adhered to. Positive and negative social impacts have been identified. The assessment of the key issues indicated that there are no negative impacts that can be classified as fatal flaws, and which are of such significance that they cannot be successfully mitigated. Positive impacts could be enhanced by implementing appropriate enhancement measures and through careful planning. In addition, this will also create local business opportunities benefitting the socio-economic development of the local communities of Boshoek and the surrounds. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the negative environmental and socio-economic impacts associated with a coal-based energy economy and the challenges created by climate change, represents a significant positive social benefit for society as a whole.	Volume II: Social Impact Assessment
Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?		The ecology, avifauna and aquatic specialists have all concluded that the development does not have unacceptable negative impacts that cannot be mitigated to a low or medium level of significance.	Volume II: Specialist Reports
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?		Iterative specialists' constraints mapping identified the most suitable areas for development for which a development layout was then produced for assessment. The results of the specialist's studies further informed the development of the preferred layout.	Volume II: Specialist Reports
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?		New data in the form of the REEA 2024 Q1 Data has been made available after the release of the March 2024 SIA, indicating additional developments in the area. An additional three projects have been identified in close proximity to the Boshoek 2 Solar PV Facility, and Boshoek Solar Cluster Facility.. In terms of a 50 km cumulative radius, three additional REFS, apart from the aforementioned REFS will be considered. Existing renewable energy projects that were considered in terms of their potential cumulative terrestrial ecological impacts, that are in an approximate 50 km radius of the Boshoek Solar 1 Energy Facility.	Volume II: Terrestrial Biodiversity Impact Assessment

"securing ecological sustainable development and use of natural resources"[2]		
	Subsequently, as mentioned, apart from the other two Boshoek SEF projects (Boshoek Solar PV 2 and 3), only four other REFs are currently included within the REEA database (May 2023), and which are located within the 50 km radius. The construction and operation of the Boshoek Solar 1 is expected to have a limited to very limited contribution to the cumulative impacts of the area and will not: • compromise the ecological functioning of the larger "natural" environment; and • disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. The combined, cumulative footprint of all renewable energy projects (located within the 50 km radius) will increase from around 4407.6 ha, to approximately 5274.4 ha (increase of 866.8 ha) covering only 0.6 % of the area within the 50 km radius (increase of only 0.1%) (Figure 36). Of the 5274.4 ha, Boshoek Solar 1 SEF will contribute approximately 6.5 % (343.1 ha). The contribution of the Boshoek Solar 1 SEF, to the loss of natural/near-natural to moderately modified vegetation within the 50 km radius is even smaller as most of the project site is located within already transformed and degraded areas. In terms of the cumulative impact on the Zeerust Thornveld Vegetation Type, the bulk of the cumulative footprint located within the Zeerust Thornveld Vegetation Type, with very small insignificant amounts extending into Gold Reef Mountain Bushveld (286.8 ha or 5.4% of combined footprint) and Dwaalboom Thornveld (885.8 ha or 16%). Thus, the remaining 4102 ha (78 %) will be located within the Zeerust Thornveld Vegetation Type. For an impact on vegetation types and ecosystems one will have to look beyond the 50 km radius, at all of the REFs located completely or partially within this ecosystem/vegetation type. The combined footprint of all the REFs located within the Zeerust Thornveld Vegetation Type will be approximately 5828 ha and will impact only 1.4 % of the total extent of the mentioned vegetation type (thus the inclusion of the new additional sites within the latest REFA data base will only contribute to a 0.2% increase in cumulative footprint within the Zeerust Thornveld Vegetation Type). The contribution of the Boshoek Solar 1 SEF itself will be very small to insignificant and thus the cumulative impact of the REFs on the affected vegetation type will be insignificant and will not impact or threaten the conservation targets as well as Red List status of this vegetation type.	

"securing ecological sustainable development and use of natural resources"[2]		
	The cumulative loss and transformation of intact habitats pose a significant threat to the status and ecological functioning of provincially identified Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), thereby affecting the biodiversity conservation targets outlined by the North West Province. Within a 50 km radius, five out of seven Renewable Energy Facilities (REFs) are situated almost entirely within ESA 1 (natural) and/or ESA 2 (unnatural), which aids crucial corridors and nodes for wildlife movement. Among these REFs, only two PV facilities namely the Boshoek PV 2 SEF and the 65 MW Rhino SEF is located entirely within a CBA2 Corridor Node. Regarding ecosystem functions and services, particularly landscape connectivity, the three Boshoek PV SEFs including the Rhino Solar, Onderstepoort Solar 1 and Onderstepoort Solar 2 SEFs are expected to exert a cumulative impact due to their close proximity to one another and their adjacency to identified corridor nodes and linkages (CBAs). Although all SEFs apart from Boshoek Solar 2 are positioned within ecological support areas that connects three Corridor Nodes and a Critical Corridor Linkage, their current contribution to landscape connectivity is minimal. This is primarily due to extensive habitat transformation and degradation on these properties, which are extensively used for intensive game breeding activities. These properties are divided into small game breeding camps enclosed by highly secure, electrified game fences, which are rigorously monitored, severely constraining natural movement across the area.	

TABLE 5-2 SOCIO-ECONOMIC CONSIDERATIONS OF NEED AND DESIRABILITY FOR THE BOSHOEK SEF 1

"promoting justifiable economic and social development"[3]			
Question		Answer	Reference
What is the socio-economic context of the area, based on, amongst other considerations, the	*The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans,*	Bojanala Platinum District Municipality Integrated Development Plan (2023-2024) The 2023/24 Reviewed IDP is a result of extensive consultation with the various role players as demonstrated by the developmental priorities that	Volume II: Social Impact Assessment

[3]Section 24 of The Constitution of South Africa refers.

"promoting justifiable economic and social development"[3]			
following considerations?:	*frameworks of policies applicable to the area,*	each municipality put forward. A situation analysis is made of where the municipalities are at present and where they want to be in future. The infrastructure and services delivery, socio-economic, spatial development and economic framework are respectively outlined. The way forward is subsequently concretized by a strategic long-term vision and secondly, by the detail in which these strategic objectives will be achieved. The district municipality derives the following mandate from Section 152 of the Constitution of South Africa, Act 108 of 1996: • To promote democratic and accountable local government. • To ensure the provision of services to communities in a sustainable manner/. • To promote social and economic development. • To promote a safe and healthy environment; and • To encourage the involvement of communities and community organizations in the matters of local government The Bojanala Platinum District Municipality (BPDM) Integrated Development Plan emphasises the import of the nine-point plan as announced during the 2015 state of the Nation Adress as part for the government's strategy to implement the NDP. Among others the nine-point plan focus on critical areas such as energy, tourism, agriculture, boosting Small Medium and Micro Enterprise (SMMES), science and technology, industrialisation, and transport. The components of the nine-point plan include: • Resolving the energy challenge • Revitalising agriculture and the agro-processing value chain • Advancing beneficiation or adding value to the mineral wealth • More effective implementation of a higher impact Industrial Action Policy Action Plan (IPAP) • Encouraging private-sector investment • Moderating workplace conflict • Unlocking the potential of SMMEs, cooperatives, townships, and rural enterprises • State reform and boosting the role of state-owned companies, science, technology and innovation, information, and communications	

"promoting justifiable economic and social development"[3]			
		technology infrastructure or broadband roll-out, water, sanitation, and transport infrastructure • Operation Phakisa, which is aimed at growing the ocean economy and other sectors Although the nine-point plan is led by national departments, the local government, as the sphere closest communities play a significant role in its realisation, hence the need for the IDP to take cognisance of the plan. Kgetlengrivier Local Municipality Integrated Development Plan (IDP) (2021-2022) The integrated Development Process (IDP) is an approach to planning that involves the whole municipality and its citizens in finding the best solutions to achieve effective long-term development. The IDP is done in line with the Municipal Systems Act: Section 23, which requires each municipal council to within a prescribed period after the start of its elected term, adopt a single, inclusive, and strategic plan for the development of its area of jurisdiction. The IDP development objectives are an indication of what the municipality would like to achieve in the medium term to deal with the problems outlined in phase one. All strategies and political objectives of (KRLM) are indicated in this section. The five strategic objectives are listed below. • Strategic Goal 1: To provide Sustainable services to the communities. • Strategic Goal 2: to create economic opportunities within the municipality. • Strategic Goal 3: To provide prudent management and effective administration. • Strategic Goal 4: To provide sound good governance to the local communities. • Strategic Goal 5: To ensure a sound fiscal management and viability. KRLM does not have a Local Economic Development (LED) Strategy in place. LED one of the ways through which the municipality can contribute to decreeing unemployment and poverty. The goal of local economic development is for the municipality to take the lead in growing the local economy by creating jobs and favourable environment for other stakeholders to create jobs. LED is a process by which public, business,	

"promoting justifiable economic and social development"[3]			
		and non-governmental sectors work jointly to create better circumstances for economic growth and job creation to advance a local area's economic identity. Local economic development is part of Integrated Development Planning and as such all stakeholders must play a role in the development and implementation of the LED strategy. The following are some of the objectives that are outlined in the IDP: **Economy & Employment** • Identify sectors with development opportunities; • Develop SMMEs in each sector and promote participation; • Broaden the economic base through the integration of diverse economic initiatives; • Improve developmental capability of the public and private sector as PPPs; and • Improve local job creation. **Infrastructure** • Develop infrastructure to provide access to services and promote rural inclusion; and • Improve public transport and mobility in rural areas. **Sustainable and Enabling Environment** • Use natural resources more efficiently; • Increase awareness and participation among rural communities; • Ensure proposed strategies comply with environmental requirements; • Create a stable business environment; • Increase confidence levels of the public and private sector investors; and • Unlock under-utilised resources. **Social Protection** • Ensure provision to social welfare services; • Establish an effective and comprehensive social welfare system; • Ensure poverty alleviation; • Promote redistribution of opportunities and wealth; and • Improve efficiency in the delivery of services, reduce exclusions and address administrative bottlenecks.	

"promoting justifiable economic and social development"[3]			
	Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	**Rustenburg Local Municipality Integrated Development Plan (2022 - 2027)** The 2023/2027 five-year IDP is the 5th generation plan of the Rustenburg Local Municipality. The IDP is an attempt to refocus to get the basics right to achieve the LMs vision and ensure attainment of the basic developmental aspirations of our populace in the following areas: • Human Settlements; • Water and Sanitation Supply; • Electricity Supply; • Roads & Storm water; • Refuse Removal; and • Local Economic Development & Job Creation. Rustenburg LM has a Climate Change Management Plan. It is through this plan and other recent climate change information platforms that education and awareness initiatives to the Rustenburg LM directorates are driven from. There will be quarterly information sharing in the form of articles to individual directorates on emissions of greenhouse gasses caused by their day-to-day activities. The initiatives will include but are not limited to: • Decarbonization of Electricity –transition from coal powered electricity to renewable energy (DTIS Electrical); • Decarbonization of Transport- transition to low emissions vehicles- Electric vehicles (RRT); • Decarbonization of Economy-transition to Green Economy projects (LED); and • Decarbonization of Planning-transition to a lower Greenhouse Gas emissions and climate resilient development/building/housing (DPHS). The Agricultural Sector is also a major sector in the economy of the municipality, most of the land contained in the municipality has been cultivated and therefore environmental-significant land is mostly contained within the protected area along the Magaliesburg Mountain Range. The main purpose of the Spatial Development Framework (SDF) is to guide the form and location of the future physical development within a Municipal Area. The SDF should be flexible and be able to change its	Volume II: Social Impact Assessment

<table>
<tr><th colspan="4">"promoting justifiable economic and social development"[3]</th></tr>
<tr><td></td><td></td><td>priorities, whereas the Land Use Management System (LUMS) should be tighter and only amended where required for a particular development. The SDF should inform the content of the LUMS and does not act as a direct source of rights and control itself. In this regard, the SDF should:

• Act as a strategic, indicative and flexile forward planning tool to guide planning and decision on land development;
• Develop a clear argument or approach for spatial development in the area of jurisdiction of the municipality;
• Develop a spatial logic which guides private sector investments;
• Ensure the social, economic, and environmental sustainability of the area;
• Establishment priorities for public sector development and investment; and
• Identify spatial development priorities and places.

The purpose of the SDF is not to infringe upon existing land but to guide future land uses, and the maps should be used as a systematic representation of the desired spatial form to be achieved by the municipality.</td><td></td></tr>
<tr><td></td><td>Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and</td><td>The current land use is primarily used for mostly grazing, with very limited centre pivot irrigation with no other land use planned or occurring. No tourism or commercial hunting is associated with any of the site properties.</td><td>Volume II: Social Impact Assessment</td></tr>
<tr><td></td><td>Municipal Economic Development Strategy ("LED Strategy").</td><td>The Kgetlengrivier Local Municipality set forth a local development plan in the IDP to strategize on how to create employment opportunities in the KLM, to alleviate poverty, and to redistribute resources and opportunities for the benefits of the people in the KLM.</td><td>Volume II: Social Impact Assessment;</td></tr>
<tr><td>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?</td><td></td><td>Social impacts related to the construction phase:
<table>
<tr><th>Potential +/- Impact</th><th><u>Significance rating without mitigation</u></th><th><u>Significance rating with mitigation</u></th></tr>
<tr><td>Potential Positive Impact: The creation of local employment,</td><td>Low (+)</td><td>Medium (+)</td></tr>
</table></td><td>Volume II: Social Impact Assessment;</td></tr>
</table>

"promoting justifiable economic and social development"[3]

business opportunities, and opportunities for skills development and on-site training.		
Potential Positive Impact: Significance of the impact from the economic multiplier effects from the use of local goods and services.	Low (+)	Medium (+)
Potential Negative Impact: Influx of job seekers.	Medium (-)	Low (-)
Potential Negative Impact: Temporary increase in safety and security concerns associated with the influx of people during the construction phase	Low (-)	Low (-)
Potential Negative Impact: Added pressure on economic and social infrastructure during construction as a result of in-migration of people.	Medium (-)	Low (-)
Potential Negative Impact: Temporary increase in traffic disruptions and movement patterns during the construction phase.	Medium (-)	Low (-)
Potential Negative Impact: Nuisance impacts in terms of temporary increase in noise and dust, often associated with construction and the increase in heavy vehicles in the area.	Medium (-)	Low (-)
Potential Negative Impact: Development on agricultural land and removal of potential agricultural production.	Medium (-)	Medium (-)

Social impacts related to the operational phase:

"promoting justifiable economic and social development"[3]

Potential +/- Impact	Significance rating without mitigation	Significance rating with mitigation
Potential Positive Impact: The creation of employment opportunities and skills development opportunities during the operation phase for the country and local economy.	Medium (+)	Medium (+)
Potential Positive Impact: Development of clean, renewable energy infrastructure.	Medium (+)	Medium (+)
Potential Negative Impact: Change of the landscape characteristics and key views i.e. visual intrusion and potential glint and glare.	Medium (-)	Low (-)
Potential Positive Impact: Benefits associated with socio-economic contributions.	Medium (+)	High (+)
Potential Negative Impact: Development on agricultural land and removal of potential agricultural production	Medium (-)	Medium (-)

Social impacts related to the no-development alternative:
Should the project not continue, the negative impacts associated with the project's construction and operation phases will not occur and the status quo will continue. The area will likely remain undeveloped, and the visual impacts associated with the solar facility will not occur. Further, the potential safety and security issues associated with projects and developments will not occur, the same for the influx of job seekers to the area.
The region will however likewise not benefit from the construction of the project. The area will miss out on the opportunities for jobs that the project will create, as well as the indirect economic benefits associated

<table>
<tr><th colspan="4">"promoting justifiable economic and social development"[3]</th></tr>
<tr><td></td><td></td><td>with the construction and operation of the facility. Further, the use of green renewable energy will serve to provide alternative clean energy in the face of the realities of climate change. The project will also serve to stabilise and bolster the struggling power supply in South Africa, which has done untold damage to the economy and society of the region and country.
Social impacts related to cumulative social impacts:
<table>
<tr><th>Potential +/- Impact</th><th><u>Significance rating without mitigation</u></th><th><u>Significance rating with mitigation</u></th></tr>
<tr><td>Potential Positive Impact: An increase in employment opportunities, skills development, and business opportunities with the establishment of more than one solar energy facility.</td><td>Medium (+)</td><td>Medium (+)</td></tr>
<tr><td>Potential Negative Impact: An increase in security and safety risks resulting from the influx of job seekers and road activity associated with the construction and operations of similar facilities.</td><td>Medium (-)</td><td>Medium (-)</td></tr>
</table></td><td></td></tr>
<tr><td></td><td>Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?</td><td>The proposed development will contribute towards local economic development and skills development programs of the local and district municipality through the support and co-operation between public and private sectors, creation of employment and business opportunities, and the opportunity for skills development and on-site training during both construction and operation phases.
An important focus of the REIPPPP is to ensure that the build programme secures sustainable value for the country and enables local communities to benefit directly from the investments attracted into the area. In this regard Independent Power Producers (IPPs) are required to contribute a percentage of projected revenues accrued over the 20-year project operational life toward Socio-economic Development (SED) initiatives. These contributions are linked to Community Trusts and accrue over the 20-year project operation life and are used to invest in housing and infrastructure as well as healthcare, education, and skills development.</td><td>Volume II: Social Impact Assessment</td></tr>
</table>

"promoting justifiable economic and social development"[3]			
		Community Trusts provide an opportunity to generate a steady revenue stream that is guaranteed for a 20-year period. This revenue can be used to fund development initiatives in the area and support the local community. The long-term duration of the revenue stream also allows local municipalities and communities to undertake long term planning for the area. The revenue from the proposed SEF can be used to support several social and economic initiatives in the area, including: • Creation of jobs; • Education; • Support for and provision of basic services; • School feeding schemes; • Training and skills development; and • Support for SMME's.	
How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?		The proposed development will contribute towards the local economic development strategies of the local and district municipality through the creation of employment and business opportunities, and the opportunity for skills development and on-site training during the construction, operation and decommissioning phase. The REIPPPP also contributes to Broad Based Black Economic Empowerment (BBBEE) and the creation of black industrialists. In this regard, Black South Africans own, on average, 34% of projects that have reached financial close (BW1-BW4), which is 4% higher than the 30% target. This includes black people in local communities that have ownership in the IPP projects that operate in or near their communities and represents the majority share of total South African Entity Participation.	Volume II: Social Impact Assessment
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?		Solar energy facilities are socially and economically sustainable in the short and long term. IPP projects require a minimum ownership of 2.5 % by local communities which represents a significant injection of capital into mainly rural areas of South Africa for the lifespan of the facility. In addition, local content minimum thresholds result in a substantial stimulus for establishing local manufacturing capacity.	Volume II: Social Impact Assessment
In terms of location, describe how the placement of the proposed development will:	*result in the creation of residential and employment opportunities in close proximity to or integrated with each other,*	The construction phase will extend over a period of approximately 12 months and create in the region of 500 employment opportunities. Members from the local communities in the area, would be able to qualify for percentage of the low skilled and semi-skilled employment opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members of the community.	Volume II: Social Impact Assessment;

"promoting justifiable economic and social development"[3]			
		The typical lifespan of SEFs is 20 to 25 years. During the operational phase there will be a significant decrease in employment opportunities. The operational phase of the proposed project will create in the region of 50 full time employment opportunities during the operational phase, of which 70% will be unskilled, 25% semi-skilled 25%, and 5% skilled. Typical employees that might be required include: Technicians, electricians, engineers, IT specialists, environmental specialists, health and safety managers, and administrators (skilled); drivers and equipment operators (semi-skilled); construction workers and security staff (low-skilled). The recruitment process and the requirements for each skill level and each employment opportunity need to be clearly communicated to local communities to ensure that no unrealistic expectations are created.	
	reduce the need for transport of people and goods,	The need for transport of people and goods will be increased during the construction phase. Lower per capita carbon footprints are predicted due to the commercial forms of transport that will be employed to move the workforce (e.g. public transport, contractor buses).	Volume II: Traffic Impact Assessment;
	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.	n/a
	compliment other uses in the area,	Local communities and their service providers will benefit from the socio-economic development provided by the SEF and current land use will be able to continue.	Volume II Social Impact Assessment;
	be in line with the planning for the area,	The proposed SEF is in line with applicable international, national, provincial and local planning strategies.	Volume II Social Impact Assessment

"promoting justifiable economic and social development"[3]			
	for urban related development, make use of underutilised land available with the urban edge,	The proposed development occurs away from the urban edge.	n/a
	optimise the use of existing resources and infrastructure,	• Solar energy is a renewable, clean resource and reduces pollution and the reliance on non-renewable fossil fuels and water for electricity generation; • Existing access roads will be utilised wherever possible; • The development is proposed to connect to the existing Eskom Gamma substation; • It is expected that any construction water required will be delivered by tankers; • Waste removal will be in accordance with best practice by qualified waste removal contractors to the nearest registered landfill; • Portable sanitation facilities will be utilised during construction, so that no connection to the local sewerage system will be required; and • Any additional infrastructure required will be constructed by the developer.	n/a
	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),	No opportunity costs in terms of bulk infrastructure expansions in non-priority areas are predicted due to the proposed development. The proposed SEF is not located within a bulk infrastructure expansion area.	n/a
	discourage "urban sprawl" and contribute to compaction/densification,	Not applicable as the proposed development site lies outside of urban areas.	n/a
	contribute to the correction of the historically distorted spatial patterns of settlements and to the	The project will contribute to economic and infrastructure development in the North West Province.	n/a

"promoting justifiable economic and social development"[3]			
	optimum use of existing infrastructure in excess of current needs,		
	encourage environmentally sustainable land development practices and processes,	Construction of the renewable energy Boshoek Solar 1 project will assist South Africa in transitioning from a carbon-intensive resource use economy to a sustainable low carbon footprint economy. Sustainable land development is an overarching aspect of the proposed project development.	n/a
	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.),	• Feasibility of access for Solar PV panel delivery, the site is easily accessible from the national road; • Close proximity to the Eskom grid with available evacuation capacity; • Viable solar resource, therefore suited to solar farm development; • The proposed site is agricultural land and current land use is low intensity gazing; and • Willingness of landowners to host a solar farm on their properties.	Section 6: Site Alternatives
	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 proposed development will create jobs and contribute towards socio-economic development in an area that does not have high economic potential. The SEF is likely to result in significant positive socio-economic opportunities.	Vol II: Social Impact Assessment
	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	While the proposed SEF could generally have a 'high' visual impact significance, the current layout has largely avoided the scenic resources and sensitive visual receptors of the area. Impacts to the cultural landscape are unavoidable but only of a medium significance and no other aspects of heritage are expected to be impacted significantly.	Vol II: Social Impact Assessment; Visual Impact Assessment; Heritage Impact Assessment
	in terms of the nature, scale and location of the development promote or act as a catalyst to create	The proposed development aligns with the Kgetlengrivier Local Municipality Integrated Development Plan (IDP) (2021-2022). The proposed development is predicted to support the creation of a more integrated settlement.	Vol II: Social Impact Assessment

"promoting justifiable economic and social development"[3]			
	a more integrated settlement?		
How were a risk-averse and cautious approach applied in terms of socio-economic impacts?:	*What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?*	In preparation of the final SIA report, some of the project projections reflected in this SIA Report (i.e., with regards to job creation and local content) may be subject to change, and therefore may be higher or lower than those estimated by the project proponent.	Vol II: Social Impact Assessment
	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?	The risk due to limits of current knowledge is considered to be low due to the positive socioeconomic impact expected from the proposed SEF.	Vol II: Social Impact Assessment
	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?	A risk-averse and cautious approach was utilised throughout the impact assessment process by all specialists. The precautionary approach has been adopted for this study, i.e. assuming the worst-case scenario will occur and then identifying ways to mitigate or manage these impacts. Mitigation measures to manage these impacts have been provided.	Vol II: Social Impact Assessment
How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	*Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?*	Negative impacts were identified by the Social Specialist. These are: • An influx of people could result in increased pressure being placed on economic and social infrastructure, and a change in the local population. An Influx could result in an increased levels of crime and social disruption; • Temporary increase in safety and security concerns associated with the influx of people during the construction phase; • Added pressure on economic and social infrastructure during construction as a result of in-migration of people; • Temporary increase in traffic disruptions and movement patterns during the construction phase;	Vol II: Social Impact Assessment App B: EMPr EIAr Section 10

"promoting justifiable economic and social development"[3]			
		• Nuisance impacts in terms of temporary increase in noise and dust, often associated with construction and the increase in heavy vehicles in the area; • Development on agricultural land and removal of potential agricultural production; • Change of the landscape characteristics and key views i.e. visual intrusion and potential glint and glare; and • Development on agricultural land and removal of potential agricultural production. Measures to avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts are provided in the Social Impact Assessment, Section 10 of this EIAr, and are included in the EMPr.	
	Positive impacts. What measures were taken to enhance positive impacts?	Positive impacts were identified by the Social Specialist. These are: • The creation of employment opportunities and skills development opportunities during the construction phase for the country and local economy; • Significance of the impact from the economic multiplier effects from the use of local goods and services; • The creation of employment opportunities and skills development opportunities during the operation phase for the country and local economy; • Development of clean, renewable energy infrastructure; • Benefits associated with socio-economic contributions; and • An increase in employment opportunities, skills development, and business opportunities with the establishment of more than one solar energy facility.	Vol II: Social Impact Assessment EIAr Section 10
Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?		It is not expected that the development's socio-economic impacts will result in significant ecological impacts. Although the development would result in some habitat loss across the site, this is not likely to affect the fauna and flora. Through the avoidance/exclusion of sensitive faunal habitats and the implementation of mitigation measures, regional faunal populations will likely not be significantly impacted and impacts on any faunal SoCC should be successfully avoided. It is highly unlikely that the proposed development will have a significant impact on fauna and their populations within the area as these species are also fairly well represented outside of the development footprint.	Vol II: Terrestrial Biodiversity Assessment

"promoting justifiable economic and social development"[3]			
What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?		Iterative specialists' constraints mapping identified the most suitable areas for development for which a development layout was then produced for assessment. The results of the specialist's studies, including interviews by the Social Specialist, and Scoping phase PPP, further informed the development of the updated site layout.	Volume II: Specialist Assessment Reports
What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (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?*	The proposed development aligns with a variety of planning policies that consider environmental and spatial justice. Alternatives were 'scoped' out in the scoping phase and the most feasible environmentally and socially preferred location was chosen for approval in the EIA phase. Public consultation considers all person(s) and the application process will continue to consider all persons, and disadvantaged people who may be impacted by the development.	n/a
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?		The proposed development will contribute to equitable access by supplying electricity to the national grid, and by providing local and regional socioeconomic benefits in terms of the REIPPPP Economic Development requirements, which includes a BBBEE scorecard on which solar projects are evaluated.	n/a
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?		Construction, operation and decommissioning of the proposed development will be done according to environmental health and safety legislative requirements and applicable guidelines.	n/a
What measures were taken to:	*ensure the participation of all interested and affected parties,*	Public participation is being undertaken according to NEMA: EIA Regulations (2014) as amended and DFFE (2017) Public Participation Guidelines.	Section 9; Volume III

"promoting justifiable economic and social development"[3]			
	provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	The PPP is being undertaken in terms of legislative requirements and best practice guidelines. All notifications are provided in English and Afrikaans. Further languages are made available upon request.	Section 9; Volume III
	ensure participation by vulnerable and disadvantaged persons,	The PPP is being undertaken according to best practice guidelines and regulatory requirements; Notification of initiation of the PPP was provided in all required channels, i.e. newspaper adverts, site notices, local posters and written notifications.	Section 9; Volume III
	promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	The proposed development fits into the various planning policies and the implementation of a Community Trust will assist the local strategies, including improving education facilities and youth development.	Vol II: Social Impact Assessment
	ensure openness and transparency, and access to information in terms of the process,	Legislative requirements and best practice guidelines are followed throughout the process. The PPP is being undertaken in terms of legislative requirements and best practice guidelines.	Section 9; Volume III
	ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and	A PPP is being undertaken in terms of legislative requirements and best practice guidelines. A Social Impact Assessment forms part of the Scoping & EIA process. The independent Social Specialist ensures that all needs and values are considered.	Section 9; Volume III: Social Impact Assessment

"promoting justifiable economic and social development"[3]			
	ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?	The Social Impact Assessment and PPP that are conducted according to legislation and guidelines ensure that women and youth are recognised and involved in the process. REIPPPP requirements place specific responsibilities on IPPs in terms of women and youth development.	Section 9; Volume III: Social Impact Assessment
Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?		The proposed SEF has a good planning fit with all applicable policies and will result in substantial local socio-economic opportunities. The key challenges facing the region are poverty and inequality and a shortage of skills. As such the proposed development will be of benefit to the local area by creating job and business opportunities, particularly for unskilled and semi-skilled local workers.	Volume II: Social Impact Assessment
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?		Future workers on the proposed development will be educated on their rights to refuse work.	n/a
Describe how the development will impact on job creation in terms of, amongst other aspects:	*the number of temporary versus permanent jobs that will be created,*	An estimated 500 temporary employment opportunities will be created for approximately 12 months (1 year) during the construction phase. Approximately 50 full time employment opportunities will be created for the operational phase of the proposed development (minimum of 20 years).	Volume II: Social Impact Assessment
	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),	Members from the local communities in Boshoek would qualify for a percentage of low skilled and semi-skilled employment opportunities and several skilled opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members from the local community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit.	Volume II: Social Impact Assessment

"promoting justifiable economic and social development"[3]			
	the distance from where labourers will have to travel,	It is expected that most workers will reside in the nearby town of Boshoek.	Volume II: Social Impact Assessment
	the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and	Members from the local communities in Boshoek would qualify for a percentage of low skilled and semi-skilled employment opportunities and several skilled opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members from the local community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. It will also be possible to increase the number of local employment opportunities through the implementation of a skills development and training programme linked to the operational phase. A percentage of permanent employees who are not locally based may purchase houses in one of the local towns in the area, such as Boshoek, others may decide to rent. Both options would represent a positive economic benefit for the region. In addition, a percentage of the monthly wage bill earned by permanent staff would be spent in the regional and local economy. This will benefit local businesses in the relevant towns. The benefits to the local economy will extend over the anticipated 20 year operational lifespan of the project. The local hospitality industry is also likely to benefit from the operational phase. These benefits are associated with site visits by company staff members and other professionals (engineers, technicians etc.) who are involved in the company and the project but who are not linked to the day-to-day operations. Procurement during the operational phase will also create opportunities for the local economy and businesses.	Volume II: Social Impact Assessment
	the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	The creation of an estimated 500 temporary (12 month) jobs and 50 permanent jobs associated with the proposed development represents a high opportunity cost, as the employment by current agriculture operations is very low, and could continue.	Volume II: Social Impact Assessment
What measures were taken to ensure:	*that there were intergovernmental coordination and harmonisation of policies,*	All applicable planning policies and legislation were considered. The proposed development fits with all planning policies.	Volume I: EIA Report Volume III: PP Report

"promoting justifiable economic and social development"[3]			
	legislation and actions relating to the environment, and	Organs of State were pre-identified and registered on the I&AP database and these were updated, if required, as the development phases have progressed.	
	that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	As registered I&APs all public correspondence including notifications of reports availability are provided.	Volume III: PP Report
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 proposed development aims to uphold the principles of sustainable development. The project team consists of suitably qualified individuals that comply with all legal requirements.	Volume I: EIA Report Volume II: Specialist Reports
Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?		Specialist mitigation measures were identified during the EIA process and provided in the EIAr and EMPr. These measures are realistic and should they change, the EMPr must be submitted to the Department and made available for public to review and comment.	Volume I: Appendix B: EMPr
What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?		An EMPr is submitted with the EIAr. The EMPr is a legally binding document, which when enforced during construction, operational or decommissioning phases, hold the applicant or their representative liable for any remedial actions as a result of negligence.	Volume I: Appendix B: EMPr
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?		The alternative selection process includes the assessment of the No Development alternative, site alternatives, design layout alternatives and technology alternatives.	Section 7

"promoting justifiable economic and social development"[3]		
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?	*Cumulative impact on an increase in employment opportunities, skills development, and business opportunities* The establishment of the proposed SEF and the two other SEFs add benefits such as skills development and job creation to the area, as well as further contributing to the local economy. The cumulative impact on the areas sense of place is rated as Medium Positive. *Cumulative impact on an increase in security and safety risks resulting from the influx of job seekers and road activity* The potential cumulative impact of development, potentially increasing crime, change in sense of place, visual, dust, and other impacts. The cumulative impact on the association with the construction and operations of similar facilities is rated as Medium Negative.	Volume II: Social Impact Assessment

5.1 THE NEED AND DESIRABILITY OF RENEWABLE ENERGY FACILITIES

SEFs can play a role in mitigating or reducing climate change, addressing South Africa's energy resource constraints and producing low-cost energy. In addition, operating SEFs in South Africa contribute significantly to the economic development of the areas in which they are located through the requirements of the REIPPPP adjudication process. This section of the report highlights the national, provincial and local plans and policies that are in support of renewable energy facilities. Throughout this section, it is demonstrated that at all levels of governance, policy supports the development of renewable energy to address energy supply issues, and to promote economic growth in South Africa.

5.1.1 CLIMATE CHANGE, DIVERSIFICATION AND DECENTRALISATION OF SUPPLY

The scientific consensus is that climate is changing and that these changes are in large part caused by human activities. Of these human activities, increase in carbon dioxide (CO_2) levels due to emissions from fossil fuel combustion is regarded as a significant contributor to anthropogenic climate change. South Africa is one of the world's largest emitters of CO_2 in absolute and per capita terms.

The National Climate Change Adaptation Strategy (NCCAS) for The Republic of South Africa Version UE10, 13 November 2019, explains that the South African primary sectors, such as agriculture and mining, which are natural resource dependent are high consumption uses of energy. The NCCAS is adopting a cluster approach to assist with the changing climate conditions and the affect it has on various sectors. An action in support of this proposed development is the approach to "create a more adaptive energy system to reduce dependence on a centralised system and increase distributed generation, especially in rural areas". "This will involve encouraging the development of an adaptive and decentralised energy system so that the system is more resilient to climate disruptions".

Renewable energy projects will play a significant role in meeting the targets of the Paris Agreement and assisting the transition to a low-carbon economy.

According to the Department of Energy's (DoE) total energy supply data of 2018, the primary source of energy in South Africa is coal, which provides approximately 65% of South Africa's energy, followed by crude oil with 18% and renewables with 11%. Natural gas contributes 3% while nuclear energy contributes approximately 2%. Electricity generation is dominated by the state-owned power company Eskom, which currently produces over 95% of the power used in the country.

If the National Development Plan (NDP) future hope is met, by 2030 South Africa will have an energy sector that promotes economic growth and development through adequate investment in energy infrastructure. The DoE Integrated Resource Plan (IRP) for electricity 2019, was promulgated in October 2019 and replaced the IRP 2010 as the country's official electricity infrastructure plan. It calls for 37 696 MW of new and committed capacity to be added between 2019 and 2030 from a diverse mix of energy sources and technologies as ageing coal plants are decommissioned and the country transitions to a larger share of renewable energy. By 2030, the electricity generation mix is set to comprise of 33 364 MW (42.6%) coal, 17 742 MW (22.7%) wind, 8 288 MW (10.6%) solar photovoltaic (PV), 6 830 MW (8.7%) gas or diesel, 5 000 MW (6.4%) energy storage, 4 600 MW (5.9%) hydro, 1 860 MW (2.4%) nuclear and 600 MW (0.8%) concentrating solar power (CSP). Additionally, a short-term gap at least 2000 MW is to be filled between 2019 and 2022, thereby further raising new capacity requirements, while distributed or

embedded generation for own-use is positioned to add 4 000 MW between 2023 and 2030. The IRP is intended to be frequently updated, which could impact future capacity allocations from various energy sources and technologies.

The NDP also includes that South Africa will have an adequate supply of electricity and liquid fuels to ensure that economic activities and welfare are not disrupted, and that at least 95% of the population will have access to grid or off-grid electricity.

A diversification of energy supplies and producers, particularly with respect to renewable energy sources, would lead to greater energy security and economic and environmental benefits. The deployment of various renewable technologies increases the diversity of electricity sources and, through local decentralised generation, contributes to the flexibility of the system and its resistance to central shocks.

According to the International Energy Agency, *"renewable energy resources ... exist virtually everywhere, in contrast to other energy sources, which are concentrated in a limited number of countries. Reduced energy intensity, as well as geographical and technological diversification of energy sources, would result in far-reaching energy security and economic benefits."*

5.1.2 ECONOMIC DEVELOPMENT AND JOB CREATION

South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. The mining and manufacturing sector have been severely impacted and will continue to be impacted until such time as there is a reliable supply to energy. The Minister of Mineral Resources and Energy, Gwede Mantashe, indicated in February 2023 that the cost of load shedding was estimated at R1 billion a day . The South African Reserve Bank indicated in February 2023 that stage 3 and stage 6 loadshedding cost the South African economy between R204 million and R899 million a day.

A survey of 3 984 small business owners in 2019 found that 44% said that they had been severely affected by load shedding with 85% stating that it had reduced their revenue, with 40% of small businesses losing 20% or more or revenue during due to load shedding period.

The REIPPP programme represents the country's most comprehensive strategy to date in achieving the transition to a greener economy. The main economic development (ED) beneficiaries of approved projects are currently communities living within a 50 km radius of renewable energy facilities.

REIPPPP contributes to Broad Based Black Economic Empowerment (BBBEE) and the creation of black industrialists. In this regard, Black South Africans own, on average, 34 % of projects that have reached financial close between bid window (BW) 1 and BW 4, which is 4% higher than the 30% target. This includes black people in local communities that have ownership in the Independent Procurement Programme (IPP) projects that operate in or near their communities and represents the majority share of total South African Entity Participation. The regulations require a minimum ownership of 2.5% by local communities in IPP projects as a procurement condition. This is to ensure that a substantial portion of the investments has been structured and secured as local community equity. An individual community's dividends earned will depend on the terms of each transaction corresponding with the relevant equity share. To date all shareholding for local communities have been structured through the establishment of community trusts. For projects in BW 1 to BW 4, qualifying communities will receive R25.5 billion

net income over the life of the projects (20 years). The report notes that the bulk of the money will however only start flowing into the communities from 2028 due to repayment obligations in the preceding years (repayment obligations are mostly to development funding institutions). However, despite the delay this represents a significant injection of capital into mainly rural areas of South Africa. If the net projected income for the first seven bid windows (BW 1 – BW 4) was structured as equal payments overtime, it would represent an annual net income of R1.27 billion per year. Income to all shareholders only commences with operation of the facility. Revenue generated to date by the 85 operational IPPs amounts to R149.9 billion.

In addition to the financial investments into the economy and favourable equity structures aimed at supporting BEE, the REIPPPP also targets broader economic and socio-economic investment. This is through procurement spend and local content.

To date, a total of 63 291 job years have been created for South African citizens, of which 48 110 job years were in construction and 15 182 in operations. These job years should rise further past the planned target as more projects enter the construction phase. Employment opportunities across BW 1 - 4 are 143 % of the planned number during the construction phase (i.e., 33 707 job years), with 6 projects still in construction and employing people. The number of employment opportunities is therefore likely to continue to grow beyond the original expectations. By the end of December 2021, 85 projects had successfully completed construction and moved into operation. These projects created 44 172 job years of employment, compared to the anticipated 30 488. This was 45 % more than planned.

An important focus of the REIPPPP is to ensure that the build programme secures sustainable value for the country and enables local communities to benefit directly from the investments attracted into the area. In this regard, IPPs are required to contribute a percentage of projected revenues accrued over the 20-year project operational life toward socio-economic development (SED) initiatives. These contributions accrue over the 20-year project operation life and are used to invest in housing and infrastructure as well as healthcare, education, and skills development.

The minimum compliance threshold for SED contributions is 1% of the revenue with 1.5% the targeted level over the 20-year project operational life. For the current portfolio of projects, the average commitment level is 2%, which is 101% higher than the minimum threshold level. To date (across BW 1 - 4) a total contribution of R22.8 billion has been committed to SED initiatives. Assuming an even, annual revenue spread, the average contribution per year would be R1.1 billion. Of the total commitment, R18.5 billion is specifically allocated for local communities where the IPPs operate. With every new IPP on the grid, revenues and the respective SED contributions will increase.

In terms of ED and SED spend, education, social welfare, and health care initiatives have a SED focus. IPPs have supported 1 388 education institutions with a total of R437 million in contributions, from 2015 to the end of June 2021. A total of 1 276 bursaries, amounting to R210.8 million, have been awarded by 67 IPPs from 2015 until the end of June 2021. The largest portion of the bursaries were awarded to African and Coloured students (97.4%), with women and girls receiving 56.3% of total bursaries. The Northern Cape province benefitted most from the bursaries awarded, with 57.2%, followed by the Eastern Cape (20.2%) and Western Cape (14.1%). Enterprise development and social welfare are the focus areas that have received the second highest share of the contributions to date.

5.2 POLICIES IN SUPPORT OF RENEWABLE ENERGY

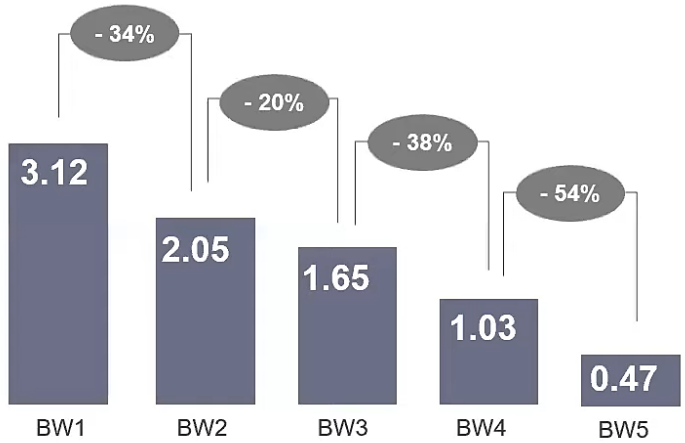
Renewable energy is supported in terms of meeting the country's climate change goals, and in terms of reducing the country's dependence on fossil fuels as the main source of meeting the country's electricity requirements. The National Climate Change Adaptation Strategy (NCCAS)[4] for The Republic of South Africa Version UE10, 13 November 2019, explains that the South African primary sectors, such as agriculture and mining, which are natural resource dependent are high consumption uses of energy. The NCCAS is adopting a cluster approach to assist with the changing climate conditions and the affect it has on various sectors. An action in support of this development is the approach to "create a more adaptive energy system to reduce dependence on a centralised system and increase distributed generation, especially in rural areas". "This will involve encouraging the development of an adaptive and decentralised energy system so that the system is more resilient to climate disruptions".

Both national and provincial policies and planning documents support the development of renewable energy facilities. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework, Integrated Resource Plan (IRP) and National Infrastructure Plan. At a provincial level, the development of renewable energy is supported by the Renewable Energy Strategy for the North West Province of 2012, as well as the Provincial Spatial Development Framework (PSDF) of 2020 and Integrated Development Plan (IDP) for 2022-2027.

The need and desirability for renewable energy developments play a key role in South Africa meeting its energy and climate change targets and provides a socio-economic boost at the local level in areas that are in need of it.

Aside from environmental considerations, investment in renewables have been driven by dramatic reductions in their costs. Figure 5-1 shows this trend and that in the six years between bid windows 4 and 5, the average price of electricity purchased through the REIPPPP fell by 54% (Magoro, 2021).

FIGURE 5-1 REIPPP AVERAGE BID PRICES IN APRIL 2021 TERMS (MAGARO, 2021)



[4] https://www.environment.gov.za/sites/default/files/docs/nationalclimatechange_adaptationstrategy_ue10november2019.pdf

6. DESCRIPTION OF THE BASELINE ENVIRONMENT

To evaluate the potential environmental impacts, information relating to the existing environmental conditions or baseline environment is collected through field and desktop research. The baseline environment also extends into the future, although predictions of any changes can involve a high number of variables and may be subject to potentially large uncertainties. As a result, in most cases, the baseline is assumed to remain unchanged throughout the operation of the development. Where this is not the case, this is stated.

The baseline environment has been used to identify any potential sensitive receptors on and near the site, and it is used to assess what changes may take place during the construction, operation and decommissioning phases of the development and the effects, if any, that these changes may have on these receptors.

Within each technical assessment, data is collected from public records and other archive sources and where appropriate, extensive field surveys are carried out. The timing/seasonality of the work within the study area is also outlined within each assessment where applicable.

6.1 REGIONAL AND LOCAL CONTEXT

The project development site is located approximately 33 km north west of Rustenburg within the Kgetlengrivier and Rustenburg Local Municipalities and the Bojanala Platinum District Municipality, in the North West Province.

Bojanala Platinum District Municipality (BPDM) is one of the four District Municipalities in the North West Province and is situated to the east of the province. BPDM is a Category C municipality in terms of the Municipal Structures Act, Act No 58 of 1999, and also in terms of Section 152 of the Constitution of the Republic of South Africa, Act No. 108 of 1996.

Mahikeng, formerly Mafeking, serves as the provincial capital. Other significant towns include Brits, Klerksdorp, Lichtenburg, Potchefstroom, Rustenburg and Sun City. The province has two universities: the University of North West, which was formerly called the University of Bophuthatswana in Mmabatho; and Potchefstroom University for Christian Higher Education. The province is home to an estimated 3.5 million people, with the most dominant ethnic group is the Setswana-speaking Tswana, joined further by smaller populations of Afrikaans, Sesotho, and IsiXhosa speaking people.

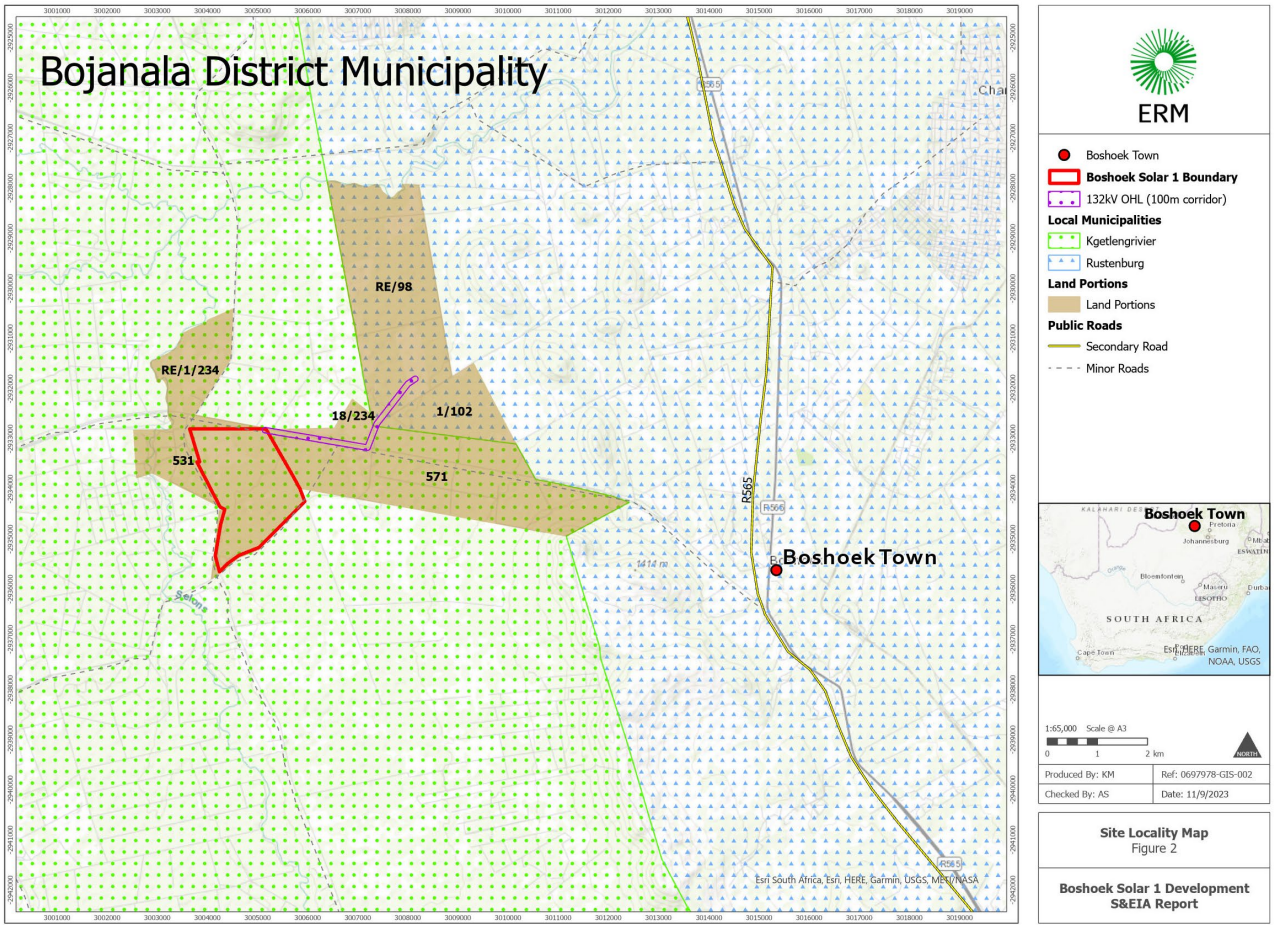
TABLE 6-1 DETAILS OF THE AFFECTED FARM PROPERTIES AND SG 21 CODES

Farm Name	Portion No.	Farm No.	SG 21 Codes
Farm Rhenosterdoorns	0	531	TOJP00000000053100000
Farm Zwaarverdiend	1	234	TOJP00000000023400001
Farm Zwaarverdiend	18	234	TOJP00000000023400018
Farm Paul Bodenstein Landgoed	Remaining Extent	571	TOJQ00000000057100000
Farm Elandsfontein	1	102	TOJQ00000000010200001
Farm Onderstepoort	Remaining Extent	98	TOJQ00000000009800000

TABLE 6-2 DEVELOPMENT AREA GEOGRAPHIC COORDINATES – BOSHOEK 1 SEF

Proposed Boshoek 1 SEF Site Boundary and Associated Infrastructure		
Aspect	Latitude	Longitude
Centre Point	25° 28’ 26.74”	26° 59’ 24.39”
North West corner	25° 27’ 49.54”	26° 58’ 55.96”
North East corner	25° 27’ 49.65”	26° 59’ 45.11”
South East corner	25° 28’ 31.56”	26° 0’ 9.48”
South West corner	25° 29’ 12.11”	26° 59’ 15.22”

FIGURE 6-1 LOCATION OF THE PROPOSED DEVELOPMENT (RED POLYGONS) NORTH-WEST OF THE TOWN OF RUSTENBERG



6.2 BIOPHYSICAL CHARACTERISTICS OF THE STUDY AREA

6.2.1 TOPOGRAPHY AND TERRAIN

Areas to the east and north of the study exhibit a high aesthetic appeal imparted by the hills associated with the end of the Magaliesberg Range. These areas are natural in character and have a relatively high scenic quality, within the context of the sub region and consequently are sensitive to development.

Land reforms associated with flat plains between hills and a river course. Plains have slopes of less between 0 – 2% and result in a mid to foot slope. The Altitude at the site peaks at 1,075 m above mean sea level (amsl).

Most of the zone of potential influence (study area) comprises cultivated/grazing lands and remnants of the bushveld. These landscape types have a moderate visual quality within the context of the sub-region and are moderately sensitive to development. Together these landscape types and associated topographic relief form a landscape setting of mixed character.

6.2.2 CLIMATE CONDITIONS

The climate is classified as arid to hot and therefore limiting to rain-fed cropping. The mean annual rainfall versus evaporation and the seasonal distribution of rainfall in the area means that there is an insufficient moisture reservoir to carry a crop through the season.

Some irrigation is practiced in the area on sites closer to the river, but the amount of irrigation water is very limited. There has never been irrigation on the particular farm. The agricultural potential of the site is therefore limited, predominantly by climate, to being suitable only as grazing land.

Table 6-3 below indicates the climatic conditions of the proposed Boshoek Solar 1 SEF

TABLE 6-3 CLIMATIC CONDITIONS OF THE PROPOSED BOSHOEK SOLAR 1 SEF

	Parameter	Value
Climate	Köppen-Geiger climate description (Beck *et al*, 2018)	Arid, steppe, hot
	Mean Annual Rainfall (mm) (Schulze, 2009)	535
	Reference Crop Evaporation Annual Total (mm) (Schulze, 2009)	1,570
	Climate capability classification (out of 9) (DAFF, 2017)	5 (moderate)

6.2.3 GEOLOGY

The geology of the proposed Boshoek Solar 1 SEF is underlain by Quaternary alluvium, as well as the Silverton Formation (Pretoria Group and the Transvaal Supergroup). The PalaeoMap of the SAHRIS indicates that the study area is underlain by sediments with a High (orange, Silverton Formation) and Moderate (green, Quaternary superficial deposits) Paleontological Sensitivity.

6.2.4 SOILS, LAND USE AND AGRICULTURAL POTENTIAL

Soils are mostly deep, red-yellow, apedal, freely drained with a high base status also with some vertic or melanic clays. The arid climate is the limiting factor for land capability, regardless of the soil capability and terrain.

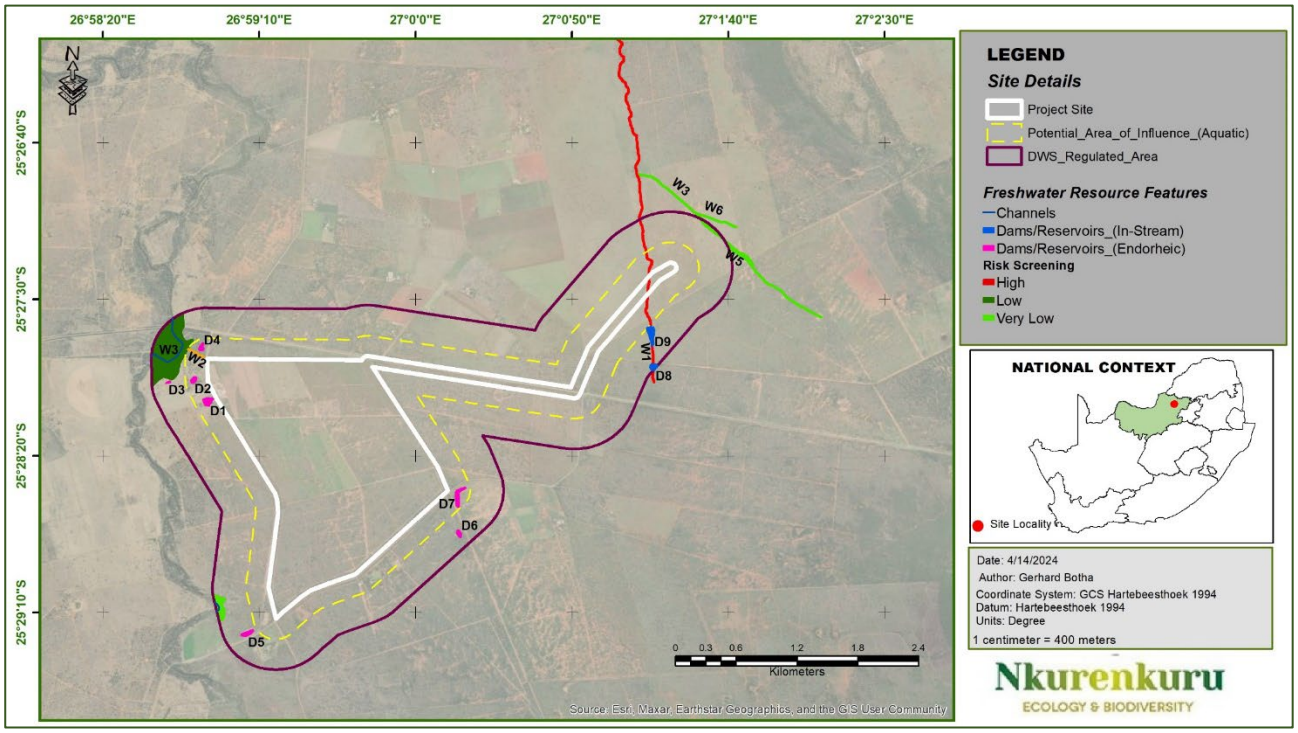
The proposed site is in an area where only grazing (game and boerbokke) and limited irrigation are practiced. Satellite imagery shows no rain-fed cropping in the area, only lands where bush is cleared to improve grazing. The climate is classified as arid and therefore limiting to rain-fed cropping. The mean annual rainfall versus evaporation and the seasonal distribution of rainfall in the area means that there is an insufficient moisture reservoir to carry a crop through the season. Some irrigation is practiced in the area on sites closer to the river, but the amount of irrigation water is very limited. There has never been irrigation on the particular farm. The

agricultural potential of the site is therefore limited, predominantly by climate, to being suitable only as grazing land.

6.2.5 FRESHWATER AND WETLANDS (AQUATICS)

An initial desktop mapping exercise was executed (prior to the site-visit), wherein all water resources (wetland and watercourses) within a radius of 500m around the proposed project site were mapped and classified at a desktop level followed by a desktop rating of risk associated with the proposed activities (Figure 12). This was undertaken to guide field assessments and inform water use identification for the proposed project. A number of natural water resources (intermittent streams and drainage lines), as well as artificially created dams/impoundments/reservoirs were identified and rated.

FIGURE 6-2 INITIAL DESKTOP DELINEATION AND RISK SCREENING OF FRESHWATER RESOURCE FEATURES WITHIN THE 500M BUFFER AREA



A review of the NFEPA coverage for the study area revealed that the PAOI will be located within two Sub-Quaternary Drainage Regions (SQDRs), both of which are not regarded as FEPA-priority SQDRs as they do not contain any FEPA-priority rivers (Nel, et al., 2011). Furthermore, the Elands River and the Selons River, both of which are non-FEPA rivers) are the primary drainage features within these SQDRs.

In terms of freshwater wetlands, the NFEPA data base has listed/mapped no wetland features within the PAOI, whilst in terms of the DWS Regulated Area, three (3) artificial wetland features (dam features) are located within this area whilst no natural wetland features have been mapped within the DWS Regulated Area. This closest FEPA-priority wetland is located approximately 9.7 km to the south-west of the PAOI (Nel, et al., 2011).

TABLE 6-4 PRELIMINARY RISK RATINGS FOR THE MAPPED WETLAND UNITS INCLUDING RATIONALE

Risk Class	Wetland Unit Number	Rationale	Triggers baseline and impact assessment
High	WC1,	These water resources will be crossed by the proposed grid line and are likely to incur direct and indirect (secondary impacts). Direct impacts may include the loss or modification of freshwater habitat (i.e. within the construction servitude) whereas expected secondary impacts are likely to be linked with construction runoff, road run-off, water quality and sedimentation of freshwater habitat.	Yes
Moderate	WC2	These water resource units are located either directly downslope/downstream or directly adjacent to the proposed infrastructure. No direct impacts are expected although indirect secondary impacts linked with road run-off, water quality and sedimentation of freshwater habitat are likely to occur.	Yes
	WC3 (a)	These water resource units are either located in separate micro-catchments or some distance downslope or downstream of the proposed development. Risk from secondary impacts are low and measurable impacts to these water resources are unlikely.	No
Very Low	WC3 (b), WC4, WC5 & WC6	These water resource units are either located in separate micro-catchments or some distance downslope or downstream of the proposed development. Risk from secondary impacts are very low and measurable impacts to these water resources are highly unlikely.	No

The baseline habitat assessment, informed by on-site data collection, focused primarily on freshwater resource units rated as being at Moderate to High risk of being impacted by the proposed activities.

This section sets out the findings of the baseline assessment of those water resources units and includes:

- Delineation, Classification and Habitat Descriptions;
- Present Ecological State (PES) Assessment; and
- Ecological Importance and Sensitivity (EIS) Assessment.

The on-site / in-field assessment of the freshwater resource indicators, of all water resources at risk (high and moderate risk) of being impacted by the proposed development, was conducted by Gerhard Botha from Nkurenkuru Biodiversity and Ecology on the 27th to the 29th of March

2023 (early autumn) and from 23rd to 24th of January 2024 (summer). Conditions during the periods of the site surveys were regarded as acceptable.

The water body delineation and classification were conducted using the standards and guidelines produced by the DWS (DWAF, 2005 & 2007), the South African National Biodiversity Institute (2009) and according to the Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems, hereafter referred to as the "Classification System" (Ollis et al. 2013). The same approach of classifying wetlands in terms of a functional unit was followed. HGM units encompass three key elements (Kotze et al, 2005):

- Geomorphic setting - This refers to the landform, its position in the landscape, and how it evolved (e.g. through the deposition of river-borne sediment);
- Water source - There are usually several sources, although their relative contributions will vary amongst wetlands, including precipitation, groundwater flow, stream flow, etc.; and
- Hydrodynamics - This refers to how water moves through the wetland.

Ultimately, it was found that, of the five freshwater resource features that were identified within the 500m buffer area, one (1) features has a high risk of being impacted by the proposed development (grid infrastructure only), whilst one (1) feature has a moderate risk of being impacted (12). Of these two (2) freshwater resource features:

- one freshwater resource feature is a narrow intermittent stream (WC1) with a wooded riparian fringe being mostly absent to very narrow; and
- the second freshwater resource feature (WC2) is a narrow drainage lines with no riparian fringe.

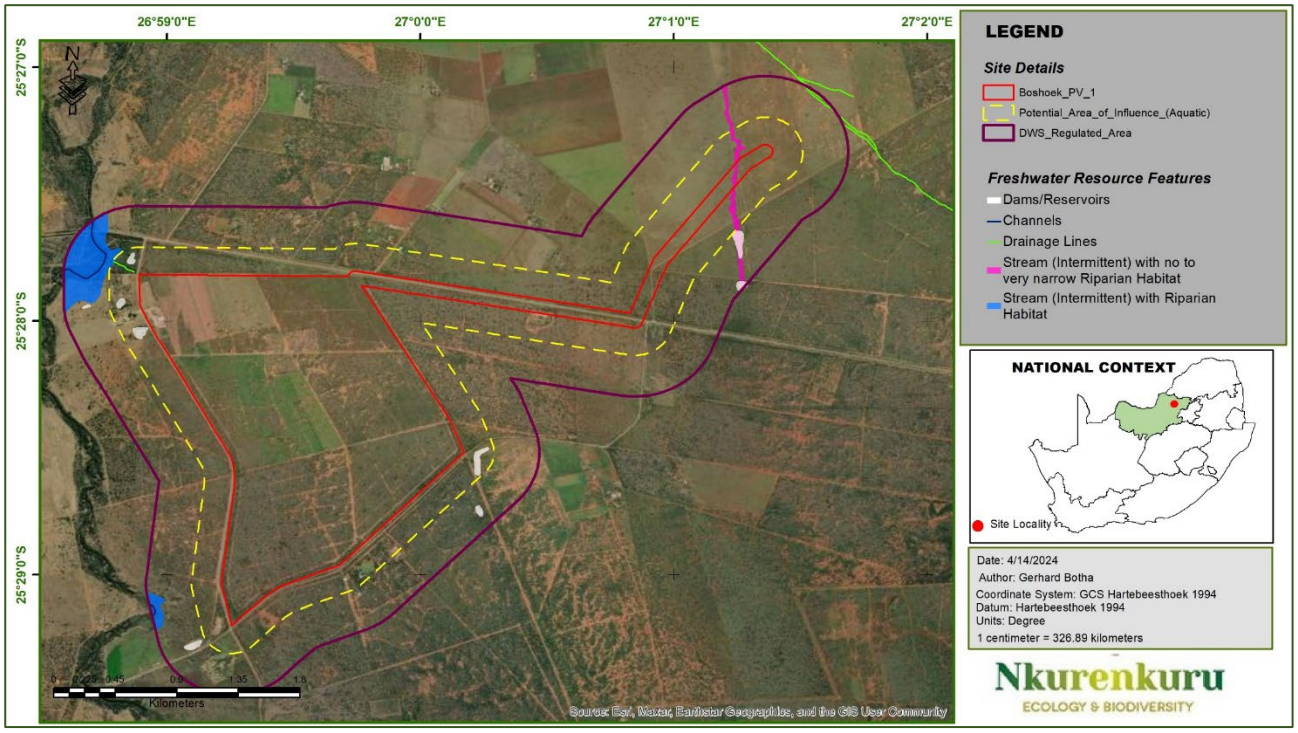
The following buffer zones were calculated for the wetlands based on the generic risk categories for Above Ground Power Line Distribution (MacFarlane et al., 2015):

- Smaller intermittent streams with no to narrow riparian fringes:
  - Electrical Grid Infrastructure Buffer: 11 m;
  - PV Solar Facility Buffer: 74 m
- Intermittent drainage line with no riparian fringe:
  - Electrical Grid Infrastructure Buffer: 11 m;
  - PV Solar Facility Buffer: 22 m

Watercourse WC2 has been subjected to fairly little to moderate change to the hydrological and geomorphological characteristics, erosion features and farm roads being the most prominent impacts. The upper reaches of WC1 have been subjected to ripping, ploughing, re-seeding and overgrazing, as this watercourse feature form part of the pasture paddock system utilized for intensive game breeding.

Both of these freshwater resource features can be regarded as intermittent, containing surface flow for only brief periods following sufficient rainfall events, with "dry" periods that are unpredictable in duration.

FIGURE 6-3 HIGH TO MODERATE RISK AQUATIC/FRESHWATER RESOURCE FEATURES DELINEATED CLASSIFIED ASSESSED INFIELD



The Present Ecological State (PES) refers to the health or integrity of an ecosystem defined as a measure of deviation from the reference state. The 'habitat integrity' of a river refers to the "maintenance of a balanced composition of physic-chemical and habitat characteristics on a temporal and spatial scale that are comparable to the characteristics of natural habitats of the region" (Kleynhans, 1996). It is seen as a surrogate for the assessment of biological responses to driver changes. The Index of habitat Integrity (IHI) is a measure of the Present Ecological State (PES) which infers the health or integrity of a river system and includes both in-stream habitat as well as riparian habitat adjacent to the main channel.

Habitat integrity for instream and riparian habitats was assessed separately based on the following indicators of habitat integrity:

- Water abstraction;
- Flow modification;
- Inundation;
- Bed modification;
- Bank erosion;
- Channel modification;
- Water quality;
- Solid waste disposal;
- Vegetation removal; and
- Exotic vegetation.

The results of the IHI assessment undertaken generally reveal the following:

- The smaller intermittent watercourse with its less pronounced to locally absent riparian fringe (WC 1) is a fairly short stream (length = 4.9 km).

This watercourse has been severely modified in terms hydrology, geomorphology and vegetation structure/composition. A large portion of this drainage lines traverse pasture paddocks. Vegetation coverage and structure, within these areas, have been completely modified through the removal of almost all trees and shrubs and the replacement of the natural grass layer with palatable grazing species such as *Cenchrus ciliaris*. Portions of this watercourse have also been ripped and ploughed in the past (prior to initial reseeding) and are subjected to significant grazing pressure (small paddocks used for intensive game breeding, mainly grazers). Furthermore, this watercourse has been dammed upstream (two small gravel dams) and such dams have a profound impact on the hydrology of smaller systems.

Subsequently WC1 is currently regarded as being in a Seriously Modified conditions.

- The short drainage line (WC2) is only 160 m in length. Limited change has occurred to the hydrological and geomorphological characteristics of this freshwater resource feature. The most significant impact is erosion, however the extent of erosion can be regarded as low to moderate-low, with isolated localities being exposed to erosion. The most likely culprit is overgrazing and the slight reduction in vegetation coverage and structure. Grazing pressure has resulted in the slight encroachment of *Senegalia mellifera*, reducing the ground cover (graminoid layer) and exposing these areas to some sheet erosion. No instream dams are present within this watercourse and as such the hydrological character of this watercourse can be regarded as natural. Watercourse crossings are very limited and restricted to tow small farm tracks.

For the purposes of this assessment, the Ecological Importance and Sensitivity (EIS) of the small stream channels and associated riparian areas was based on rating the importance and sensitivity of riparian & in-stream biota (including fauna & flora) and habitat, using available desktop information and on-site indicators/sampling undertaking during field investigations. The outcomes of a rapid instream and riparian habitat ecological importance and sensitivity assessment (using the DWAF EIS tool for rivers) is summarised below in Table 6-5 Score sheet for determining the ecological importance and sensitivity for the identified surface water resource features.

In terms of ecosystem importance and ecological sensitivity, no "High" important and sensitive aquatic features will be impacted by the proposed development. The seriously modified WC1 was considered to be of "Moderate" importance and sensitivity, containing features that are considered to be ecologically important and sensitive at a local scale and typically having a small role in providing ecological services at the local scale. WC2 (largely natural) is considered to be of a low EI&S.

TABLE 6-5 SCORE SHEET FOR DETERMINING THE ECOLOGICAL IMPORTANCE AND SENSITIVITY FOR THE IDENTIFIED SURFACE WATER RESOURCE FEATURES

DETERMINANT		IMPORTANCE SCORES (0-4) AND RATINGS	
		WC1	W2
PRIMARY DETERMINANTS	Rare & Endangered Species	1	0
	Populations of Unique Species	1	0

	Species/taxon Richness	2	1
	Diversity of Habitat Types or Features	2	1
	Migration route/breeding and feeding site for wetland species	1	1
	Sensitivity to Changes in the Natural Hydrological Regime	4	3
	Sensitivity to Water Quality Changes	3	3
	Flood Storage, Energy Dissipation & Particulate/Element Removal	3	2
MODIFYING DETERMINANTS	Protected Status	1	1
	Ecological Integrity	4	1
TOTAL		22	13
MEDIAN		2	1
OVERALL ECOLOGICAL SENSITIVITY & IMPORTANCE		C Moderate	D Low

CBAs and ESAs

Boshoek Solar 1 SEF is located within the Crocodile (West) and Marico Water Management Area and within Quaternary Drainage Region A22D which is approximately 66,474 ha in size. Thus, the proposed development will impact a very small area (< 0.5%).

The closest natural freshwater feature as identified within the NFEPA data base is the Selons River (perennial river), which is located approximately 0.36 km to the west of the project site (outside of the Aquatic PAOI), flowing in a south to north direction, feeding into the Elands River (perennial river), approximately 3 km to the north of the Boshoek Solar 1 SEF.

During the site visit, it was confirmed that no natural aquatic/wetland features were located within the proposed development site as well as the potential area of influence for aquatic biodiversity (Aquatic PAOI).

In terms of the provincial conservation context:

- No CBA1 or CBA2 aquatic features are located in close proximity to the project site. However, a few ESA1 and ESA2 features have been mapped within the DWS regulated area (outside of the PAOI);
- These ESAs are modelled stream and wetland features (based on SRTMv3 90 meter Digital Elevation Models), with ESA1 being natural features and ESA2 being non-natural/modified features; and
- Furthermore, these ESAs are associated with the Selons River as well as small tributaries, with a very small portion of the Selons River included within the DWS Regulated Area, as well as three small tributaries.

6.2.6 TERRESTRIAL BIODIVERSITY

6.2.6.1 BROAD-SCALE VEGETATION TYPES

Flora – Vegetation Types

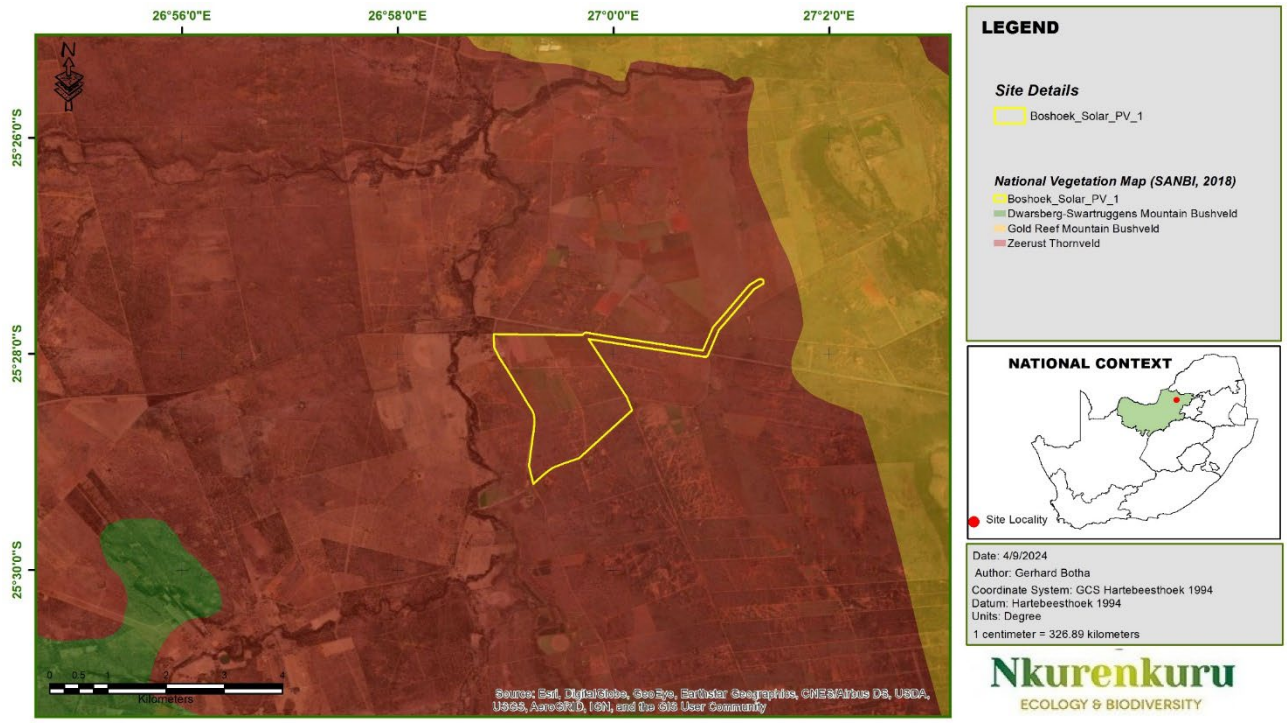
The entire study area is mapped as Zeerust Thornveld (SVcb3). This vegetation type is distributed in the North West Province and extends along the plains from the Lobatsi River in the

west via Zeerust, Groot Marico, and Mabaalstad to the flats between the Pilanesberg and western end of the Magaliesberg in the east (including the valley of the lower Selons River).

TABLE 6-6 TOTAL AREA SIZES (APPROXIMATELY) FOR VEGETATION TYPES OCCURRING WITHIN, OR NEAR, THE STUDY AREA, AS MAPPED BY THE NATIONAL VEGETATION MAP 2018

Vegetation Type	Total Area (km²)	Total Area (ha)	Threat Status
Zeerust Thornveld (SVcb3)	4 136.5	413 653	Least Concerned
Gold Reef Mountain Bushveld (SVcb9)	2 034.7	203 481.4	Least Concerned

FIGURE 6-4 MAP ILLUSTRATING THE DIFFERENT VEGETATION TYPES, ACCORDING TO VEGMAP 2018, FOR THE STUDY AREA, AS WELL AS THE GENERAL REGION



6.2.6.2 FLORA ASSESSMENT

A total of 178 plant species were found within the proposed development site, which consisted of 158 native, 0 SCC, 3 protected, 20 alien, and 7 NEM:BA listed invasive species. Furthermore, a total of 15 species were recorded within the proposed development site that were not recorded within online databases.

The following plant community types were found in the proposed development site and surrounds:

CENCHRUS CILIARIS PLANTED VELD

This community comprised a total area size of about 2.6 ha (2.7% of the total mapped area) and did not conform to any of the VegMap vegetation types, although it should technically be a part of the Gold Reef Mountain Bushveld (SVcb 9) vegetation type. This is due to it having been

transformed to a grassland (specifically planted pasture grasses), and is therefore also regarded as a disturbed/modified plant community type.

It is characterized by a moderate (50 – 75%) to high (>75%) density of vegetation cover, with little variation in topography. This type is mostly dominated by *Vachellia tortilis subsp. heteracantha* (LC) and *Ziziphus mucronata subsp. mucronata* (LC).

No SCC, alien, or NEM:BA A&IS Regulations listed species were observed in this plant community type. However, the protected plant species *Boscia albitrunca* (LC; Nationally Protected Tree) was observed, with two specimens occurring within the substation area. Any damage to these specimens must be avoided, and a permit, from the relevant local authority, is required to destroy or remove them.

The following is a list of all species that were observed in this plant community type:

- *Aristida congesta subsp. congesta* (LC);
- *Boscia albitrunca* (LC; Nationally Protected Tree);
- *Cenchrus ciliaris* (LC);
- *Eragrostis rigidior* (LC);
- *Eragrostis superba* (LC);
- *Gomphocarpus tomentosus subsp. tomentosus* (LC);
- *Heteropogon contortus* (LC);
- *Pappea capensis* (LC);
- *Searsia lancea* (LC);
- *Vachellia robusta subsp. robusta* (LC);
- *Vachellia tortilis subsp. heteracantha* (LC); and
- *Ziziphus mucronata subsp. mucronata* (LC).

CENCHRUS CILIARIS PLANTED VELD

This plant community type is located at the extreme northeastern boundary of the proposed development site and is one of the smallest plant community types, in terms of area of occupancy, that occurs within the proposed development site and surrounds.

The plant community type is dominated by *Cenchrus ciliaris* (LC). It has the lowest number of species of all plant community types in the proposed development site, and also has no unique species since all of its species are shared with other plant community types and compare with the other plant community types found in the proposed development site).

No SCC were observed. However, one protected plant species was observed, namely *Boscia albitrunca* (LC; Nationally Protected Tree). No alien or NEM:BA A&IS Regulations listed species were observed.

This plant community type has been degraded by past disturbances, notably overgrazing, as well as ploughing for pastures and resultant removal of trees and other woody shrubs. Its functional capacity within the landscape and broader ecosystem has been somewhat comprised, and some rehabilitation will have to be implemented to restore the majority of its ecosystem functions.

This plant community type is considered as very low in sensitivity since there are no SCC present. Moreover, even though protected plant species are present, they occur in very low densities across the proposed development site and can therefore easily be avoided by the proposed

activities. The limited extent of these species do not pose a significant limitation for the development. Also, the low number of unique species contributes this communities' very low sensitivity rating, since the majority of these species occur in other plant community types, and will thus not be impacted to a large degree.

Finally, the following is a summary list of all species that were observed in this plant community type:

- *Aristida congesta subsp. congesta (LC);*
- *Boscia albitrunca (LC; Nationally Protected Tree);*
- *Cenchrus ciliaris (LC);*
- *Eragrostis rigidior (LC);*
- *Eragrostis superba (LC);*
- *Gomphocarpus fruticosus subsp. fruticosus (LC);*
- *Heteropogon contortus (LC);*
- *Pappea capensis (LC);*
- *Vachellia robusta subsp. robusta (LC);*
- *Vachellia tortilis subsp. heteracantha (LC);* and
- *Ziziphus mucronata subsp. mucronata (LC).*

CYMBOPOGON CAESIUS - HETEROPOGON CONTORTUS

This plant community type is located near the extreme northeastern boundary of the proposed development site. It is one of the smallest plant community types, in terms of area of occupancy, that occurs within the proposed development site and surrounds.

The plant community type is dominated by *Cymbopogon caesius (LC), Heteropogon contortus (LC), Aristida congesta subsp. congesta (LC), Cenchrus ciliaris (LC), Eragrostis lehmanniana var. lehmanniana (LC), Themeda triandra (LC), Aristida canescens subsp. canescens (LC), and Digitaria eriantha (LC).*

This plant community type did not have a very high number of unique species, and the majority of species were shared with other plant community types (see "%Unique" in Table 1 and compare with the other plant community types found in the proposed development site).

No SCC were observed. However, one protected plant species was observed, namely *Euphorbia inaequilatera* (LC; Protected [Provincial Schedule 2]). Furthermore, 10 alien species were also observed, including 2 NEM:BA A&IS Regulations listed species, namely *Malvastrum coromandelianum (Prickly malvastrum*; Category 1b) and *Solanum elaeagnifolium* (Silver-leaf bitter apple; Category 1b).

The low number of unique species contributes this communities' low sensitivity rating, since the majority of these species occur in other plant community types, and will thus not be impacted to a large degree.

DICHANTHIUM ANNULATUM - BRACHIARIA BRIZANTHA PASTURE

This plant community type is located in the western section of the proposed development site. It is one of the largest plant community types, in terms of area of occupancy, that occurs within the proposed development site and surrounds.

The plant community type is dominated by *Dichanthium annulatum var. papillosum (LC), Brachiaria brizantha (LC), Urochloa mosambicensis (LC), Ziziphus mucronata subsp. mucronata (LC), Aristida canescens subsp. canescens (LC), Asparagus cooperi (LC), and Eragrostis lehmanniana var. lehmanniana (LC).*

This plant community type did not have a very high number of unique species, and the majority of species were shared with other plant community types (see "%Unique" in Table 1 and compare with the other plant community types found in the proposed development site).

No SCC or protected plant species were observed. However, 7 alien species was / were also observed, including 2 NEM:BA A&IS Regulations listed species, namely *Opuntia ficus-indica* (Mission prickly pear, Sweet prickly pear; Category Multi) and *Solanum sisymbriifolium* (Wild tomato, Dense- thorned bitter apple; Category 1b).

This plant community type is considered as very low in sensitivity since there are no SCC or protected plant species present. The low number of unique species also contributes to this sensitivity rating, since the majority of these species occur in other plant community types, and will thus not be impacted to a large degree.

PANICUM MAXIMUM - UROCHLOA MOSAMBICENSIS PASTURE

This plant community type is located near the northwestern boundary of the proposed development site and is a relatively small plant community type, in terms of area of occupancy, that occurs within the proposed development site and surrounds.

The plant community type is dominated by *Panicum maximum* (LC), *Urochloa mosambicensis* (LC), *Digitaria eriantha* (LC), *Brachiaria brizantha* (LC), *Dichanthium annulatum var. papillosum* (LC), *Enneapogon cenchroides* (LC), *and Eragrostis curvula* (LC).

This plant community type had only one unique species (see "%Unique" in Table 1 and compare with the other plant community types found in the proposed development site). It also had the second lowest number of species of all plant community types on site.

No SCC, protected plant species, NEM:BA A&IS Regulations listed species were observed in this plant community type. Only 3 alien species were observed.

This plant community type is considered as very low in sensitivity since there are no SCC or protected plant species present. The low number of unique species, as well as overall low richness, also contributes to this communities' very low sensitivity rating.

THEMEDA TRIANDRA - ZIZIPHUS MUCRONATA

This plant community type is located near the north-central boundary of the proposed development site. It is dominated by *Themeda triandra* (LC), *Ziziphus mucronata subsp. mucronata* (LC), *Cymbopogon caesius* (LC), *Vachellia karroo* (LC), *Asparagus laricinus* (LC), *Cenchrus ciliaris* (LC), *Cynodon dactylon* (LC), *and Nidorella resedifolia subsp. resedifolia* (LC). This plant community type had moderate number of unique species (see "%Unique" in Table 1 and compare with the other plant community types found in the proposed development site).

No SCC, protected plant species, or NEM:BA A&IS Regulations listed species were observed in this plant community type. However, 5 alien species were found.

This plant community type is considered as low in sensitivity since there are no SCC or protected plant species present. The moderate number of unique species prevents if from being "very low" in sensitivity rating, since these do not occur in other plant community types.

VACHELLIA TORTILIS - HETEROPOGON CONTORTUS: A (ERAGROSTIS LEHMANNIANA)

This plant community type is located near the extreme northeastern boundary of the proposed development site. It is one of the smallest plant community types, in terms of area of occupancy, that occurs within the proposed development site and surrounds.

The plant community type is dominated by *Eragrostis lehmanniana var. lehmanniana* (LC), *Vachellia tortilis subsp. heteracantha* (LC), *Heteropogon contortus* (LC), *Panicum maximum* (LC), *Ziziphus mucronata subsp. mucronata* (LC), *Aristida congesta subsp. congesta* (LC), *Cenchrus ciliaris* (LC), *and Cymbopogon caesius* (LC), and had a very low number of unique species (see "%Unique" in Table 1 and compare with the other plant community types found in the proposed development site).

No SCC, or NEM:BA A&IS Regulations listed species were observed in this plant community type. However, one protected plant species was found, namely *Boscia albitrunca* (LC; Nationally Protected Tree), as well as 5 alien species were found. It must be noted that a permit must be obtained from relevant local competent authorities to damage, destroy, or relocate any SCC or protected plant species; any such actions are considered illegal without a permit, in which case such species must be avoided completely. This plant community type is considered as having a medium in sensitivity rating.

ZIZIPHUS MUCRONATA - CYMBOPOGON CAESIUS: A (GREWIA FLAVA)

This plant community type covers the lower half of the proposed development site. It is the largest plant community type, in terms of area of occupancy, that occurs within the proposed development site and surrounds.

The plant community type is dominated *by Cymbopogon caesius* (LC), *Grewia flava* (LC), *Ziziphus mucronata subsp. mucronata* (LC), *Aristida canescens subsp. canescens* (LC), *Aristida congesta subsp. congesta* (LC), *Searsia lancea* (LC), *and Vachellia robusta subsp. robusta* (LC).

This plant community type had a moderate number of unique species, which were not shared with other plant community types (see "%Unique" in Table 1 and compare with the other plant community types found in the proposed development site). Also, it had the highest number of species (126) of all the plant community types in the proposed development site.

No SCC were observed. However, 2 protected plant species were observed, namely *Boscia albitrunca* (LC; Nationally Protected Tree) and *Spirostachys africana* (LC; Protected [Provincial Schedule 2]). Furthermore, 13 alien species was / were also observed, including 4 NEM:BA A&IS Regulations listed species, namely *Cereus jamacaru* (Queen of the night; Category 1b), *Datura ferox* (Large thorn apple; Category 1b), *Flaveria bidentis* (Smelter's-bush; Category 1b), and *Opuntia ficus-indica* (Mission prickly pear, Sweet prickly pear; Category Multi).

ZIZIPHUS MUCRONATA - CYMBOPOGON CAESIUS: B (ERAGROSTIS LEHMANNIANA)

This plant community type is located mostly near the north-central boundary section of the proposed development site, but also occurs as scattered patches throughout the site.

The plant community type is dominated by *Cymbopogon caesius* (LC), *Cenchrus ciliaris* (LC), *Eragrostis lehmanniana var. lehmanniana* (LC), *Grewia flava* (LC), *Heteropogon contortus* (LC), *Panicum maximum* (LC), *Themeda triandra* (LC), *Ziziphus mucronata subsp. mucronata* (LC), *Aristida congesta subsp. congesta* (LC), *and Digitaria eriantha* (LC).

Despite having the second highest number of species, this community did not have a very high number of unique species, and the majority of species were shared with other plant community types.

No SCC were observed. However, 1 protected plant species was observed, namely *Euphorbia inaequilatera* (LC; Protected [Provincial Schedule 2]). Furthermore, 11 alien species was / were also observed, including 2 NEM:BA A&IS Regulations listed species, namely *Malvastrum coromandelianum* (Prickly malvastrum; Category 1b) *Solanum elaeagnifolium* (Silver-leaf bitter apple; Category 1b).

The low number of unique species contributes to this communities' low sensitivity rating, since the majority of these species occur in other plant community types, and will thus not be impacted to a large degree.

FIGURE 6-5 MAPPING INDICATING THE DIFFERENT PLANT COMMUNITY TYPES IDENTIFIED WITHIN THE PROJECT SITE

Field observations, together with the SEI assessment presented here, indicated that the bulk of the PAOI is regarded as of "Low" sensitivity (64%). The bulk of the "Low" sensitive area have been moderately to largely modified through anthropogenic intervention in the form of brush/tree management/control (thinning out) in order to improve the grazing potential of these rangelands. Severe historical livestock overgrazing has resulted in some small patches becoming bare/devoid of vegetation, exposing these areas to soil capping/compaction. Fairly recent underutilization of these areas has resulted in *Cymbopogon caesius* becoming the dominant species. No plant Species of Conservation Concern (SCC) or highly range restricted

species/populations that are dependent on these habitats for survival, have been recorded within these areas and due to limited habitat suitability, there are some potential habitat for plant SCC.

The proposed grid corridor will cross a small/narrow drainage line which is regarded as "medium" sensitive. This drainage line has been significantly modified in terms of hydrology, geomorphology and vegetation coverage. The bulk of this drainage line is located within pasture paddocks and are subjected to significant grazing pressure (small paddocks used for intensive game breeding, mainly grazers). Furthermore, this drainage line has been dammed upstream (small gravel dams) and such dams have a profound impact on the hydrology of such smaller systems. No plant Species of Conservation Concern (SCC) or highly range restricted species/populations, that are dependent on such habitats for survival, have been recorded within the drainage line that crosses the grid corridor. This drainage line is however regarded as "Medium" sensitive as this drainage line feeds into a short intermittent watercourse, which is a minor tributary of the Elands River. Impacts on this drainage line can be successfully avoided through the implementation of buffer areas (appropriate buffer size will be provided within the Aquatic Biodiversity Report) and the mere spanning of the drainage line and the use of existing farm roads for access.

The SEI score interpretations according to the Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa (South African National Biodiversity Institute, 2020) are as follows:

- "High": requires avoidance mitigation wherever possible, or minimization mitigation, and subsequent changes to limit the amount of habitat impacted;
- "Low": minimization and restoration mitigation; and
- "Very Low": minimization mitigation.

FIGURE 6-6 SEI FOR THE PROPOSED DEVELOPMENT SITE

Provincial and National Protected Species Permitting Requirements

When SCC occur in a proposed development site or PAOI, the proposed activities could impact the SCC and result in significant biodiversity loss — the loss of SCC populations might either increase the extinction risk of the respective species, or might even contribute toward their extinction. As such, it is very important to note that a permit must be obtained from the relevant local authorities to destroy or relocate any SCC (or even protected species).

Ground truthing confirmed that no SCC occur within the proposed development site and surrounds. However, this does not mean that no SCC can occur within the proposed development site and surrounds, and thus care must still be taken to keep an eye out for any such SCC.

Furthermore, a total of 3 protected plant species were observed, namely:

- *Boscia albitrunca* (Nationally Protected Tree)
- *Euphorbia inaequilatera* (Provincial Schedule 2)
- *Spirostachys africana* (Provincial Schedule 2)

Care must be taken to avoid any of these species, should they be found. It is recommended that a pre-construction walkthrough be undertaken by a qualified botanist prior to commencement of construction. It must be noted that a permit must be obtained from relevant local competent authorities to damage, destroy, or relocate any SCC or protected plant species; any such actions are considered illegal without a permit, in which case such species must be avoided completely.

6.2.6.3 FAUNAL ASSESSMENT

The PAOI can be regarded as low and largely homogenous. Within the PAOI, four (4) major faunal habitats have been identified. Furthermore, no aquatic faunal habitats are present within the PAOI or within proximity to the PAOI.

TREE SAVANNA OCCUPYING SANDY-LOAM PLAINS

The bulk of the project site comprises this faunal habitat (210.5 ha). The bulk of the area is utilized as small breeding camps for scares and exotic game species, whilst only a small portion is utilized for livestock farming (cattle). Approximately 173.4 ha (82.4 %) of this faunal habitat has been moderately to largely modified through the artificial (mechanically) and strategically removal of certain woody species (trees and shrubs), Signs of severe historical overgrazing is also present in the form of small patches of bare soil exposed to soil capping. The remaining 18.2 % (37.4 ha) is regarded as near natural vegetation utilized for cattle farming, and is currently also being intensively overgrazed.

Furthermore, this habitat is associated with reddish, sandy loam soils (mostly deep) with no to very little surface gravel/stones. However, sallow soils with surface stones and rocks are present in one fairly small location.

Floral, alpha diversity within this habitat type was low-moderate. Typically, this habitat can be characterised as a fairly open savanna with a moderately to well-developed grass layer and medium sized trees. The grass layer is highly variable within this habitat and may cover up to 80% in areas where a dense grass layer has been encouraged through brush management. Overgrazed areas may cover a grass layer of less than 55%, and as mentioned small exposed soil patches are present, and are remnants of severe historical overgrazing. The tree layer throughout this habitat occur at a density of between 20 and 35%, with an average height of between 4 and 5 m. The shrub layer, as in the case of the grass layer, is highly variable (vary

in coverage from 10 % to 55%) and are also closely tied to land management practices (especially brush management and grazing regimes.

Key plant species found within this habitat type include: *Cymbopogon caesius, Aristida congesta var. congesta, Heteropogon contortus, Eragrostis rigidior, E. lehmanniana Themeda triandra, Urochloa mosambicensis, Grewia flava, Peltophorum africanum, Vachellia robusta, Vachellia tortilis Ziziphus mucronata, Searsia lancea, Panicum maximum, Lycium schizocalyx, Blepharis maderaspatensis, Nidorella resedifolia, Osteospermum muricatum, Seddera capensis, and Solanum campylacanthum*. The integrity and functions of this habitat type are overall regarded as moderately modified.

This low to low-moderately structurally variable habitat generally provides moderate refugia and forage. This habitat is also regarded as low-moderately important breeding site, especially for mammal species. However, natural movement patterns of "natural" occurring mammals, especially medium to larger sized mammals have been significantly impacted by tall game fences surrounding numerous small breeding camps within the project site, as well as within the larger surroundings. This, along with a fairly busy road network within the area have significantly fractured the landscape.

The highly fractured nature of the area, the low-moderate structural complexity (habitat and niche diversity) and moderate foraging potential allows for a low natural faunal diversity, with a noteworthy absence of carnivore species, apart from smaller, more adaptable carnivores such as mongooses.

Most of the species recorded within this habitat type can be regarded as habitat generalists. The most frequently observed mammals include; Common Duiker (*Sylvicapra grimmia)*, Steenbok (*Raphicerus campestris*), African Savanna Hare (*Lepus victoriae*), Slender Mongoose (*Herpestes sanguineus*).

In terms of herpetofauna diversity within this habitat, due to a low habitat and niche diversity and structural complexity, reptilian diversity is expected to be low. Only three reptile species recorded, namely: Savanna Lizard (*Meroles squamulosus*), Spotted Grass Snake (*Psammophylax rhombeatus rhombeatus*) and Mozambique Spitting Cobra *(Naja mossambica*).

No amphibian species have been recorded within this habitat, with very limited suitable habitat available for amphibian species.

In terms of faunal SCC, no species were observed within this faunal habitat.

In terms of provincially protected mammals, the following protected mammals were recorded within this faunal habitat:

- Steenbok - *Raphicerus campestris*

SAVANNA GRASSLAND AND PURE GRASSLAND OCCUPYING SANDY-LOAM PLAINS (PASTURES)

This faunal habitat represents seriously to critically modified form of the tree savanna (on sandy-loam plains), where significant bush (trees and shrubs) clearance has occurred, along with irregular ripping and ploughing and re-seeding of the areas with more palatable gras species (pastures). These activities have occurred over, at least, the last 30 to 50 years, with the aim of improving the grazing potential of these areas, in the past for intensive cattle farming, but for the last 10 to 15 years, for intensive game breeding.

This has led to significant changes in the vegetation cover and structure with this habitat now being regarded as an open grassland savanna, with the tree and shrub cover being reduced by

at least 70 to 80%, however the percentage of trees and shrubs do differ between the various pastures.
This habitat is located on weak red to reddish yellow, sandy-loam soils of varying depth (mostly moderately deep). Furthermore, this habitat is characterized by flat plains (slope>1%). Currently, these areas are all utilized for intensive game breeding (scarce and exotic game) and comprise of small game camps cordoned off by tall, mostly impenetrable game fences, which has had a significant impact on the natural movement patterns of larger, "natural" wildlife, especially carnivores.
These pastures are characterised by mostly dense, medium grassland, with grasses and forbs covering between 65 – 85% of this habitat. However, localised overgrazing has resulted in a few, mostly small patches, of sparser areas (soil capping and compaction are frequent observed within these overgrazed patches). Key or dominant grass and forb species observed within these patches include; *Cenchrus ciliaris, Brachiaria deflexa, Dichanthium annulatum, Cymbopogon caesius, Aristida congesta, Eragrostis rigidior, Aristida adscensionis, Heteropogon contortus, Nidorella resedifolia, Panicum maximum Solanum campylacanthum, Eragrostis lehmanniana, Urochloa mosambicensis, Vachellia tortilis, Ziziphus mucronata* and *Tagetes minuta*. As mentioned, the tree and shrub layer have been significantly reduced and comprise of shrub/small tree layer (*Vachellia tortilis, and Ziziphus mucronata)* with a density varying between 10% and 30%, and a medium sized tree layer covering a combined area of between 4% and 7% (most areas<5%).

Floral diversity within this habitat type was low, and as mentioned the integrity and functionality of this habitat type have been significantly modified, however this habitat is still capable of providing some functions and services, albeit in a modified manner.
Structurally, this habitat is the most homogenous, of the faunal habitats. The most significant function of this habitat is the provision of fairly good grazing, however, as mentioned the mostly impenetrable game fences have prevented the use of these pastures for medium sized "natural" occurring mammals. Furthermore, due to low structural complexity, and frequent past disturbances, "natural" faunal diversity within this habitat is low. The softer substrate is, however, more optimal for smaller fossorial or burrowing species such as mole rats, mongooses, and porcupines and subsequently, these smaller mammals are the most frequently observed species within the area. Warthog, frequently dig underneath the fences providing occasional passage to and from this habitat for smaller antelopes such as steenbok and common duiker as well as smaller carnivores such as black-baked jackal. However, these fences are frequently patrolled, and any holes/passages are promptly closed up. Meso and small carnivores such as black-baked jackal and caracal are religiously persecuted within these areas, in order to protect the breeding herds of scarce and exotic game.
No Herpetofaunal species have been recorded within this area. Subsequently, the overall faunal diversity and habitat connectivity, of this habitat can be regarded as low.

No animal SCC were recorded within the PAOI. However, there is a moderate Likelihood of Occurrence (LoO) for some animal SCC to occur within this habitat.
In terms of provincially protected mammals, only one mammal species has been recorded namely:

- Steenbok - *Raphicerus campestris*

SAVANNA SHRUBLAND OCCUPYING SANDY-LOAM PLAINS

This faunal habitat represents seriously to critically modified form of the tree savanna (on sandy-loam plains), where historic cultivation activities have been abandoned and the area being allowed to re-establish a more natural vegetation cover. These activities have occurred over, at least, the last 30 to 50 years. Following the re-establishment of a vegetation cover, the area has been utilized as grazing (cattle). This area experience high to severe grazing pressure and has resulted in the encroachment of small thorny trees and shrubs.

This habitat type is a transitional area between the typical sandy-loam areas that characterize the majority of the region and areas with a slightly higher clay content. The clay content is still quite low within this habitat, but enough to have an influence on the species composition and structure, most notable within the tree and shrub layer (especially in terms of species composition and height).

This area is also located within a flat plain (slope<1%) with very little geomorphological variations. Floral, alpha diversity within this habitat type was very low. Typically, this habitat was characterised by a moderately sparse ground cover, with numerous bare patches, exposing the soils to soil capping, sheet erosion and trampling. The grass cover is fairly sparse and is characterized by short to moderate-tall grass species (coverage: 40%), dominated by *Cynodon dactylon, Aristida canescens, Aristida adscensionis, Aristida congesta var. congesta, Melenis repens*, and Eragrostis *rigidior.* The shrub (1.6 m) and small tree (2.5 m to 3 m) layer covered collectively between 75 % and 80 % of this habitat, with Vachellia tortilis, Senegalia mellifera and *Grewia flava* being the diagnostic species within this layer. Trees taller than 3m was scarce, throughout this habitat type (predominantly *Vachellia tortilis*).

This habitat unit generally provides poor refugia and forage for faunal species. This habitat is also not regarded as an important breeding and foraging site. The grasses in this habitat are mainly wiry pioneers and sub-climax species of low palatability and forage value. The low structural complexity (habitat and niche diversity) and low foraging potential allows for a low faunal species diversity for this area. Natural movement patterns of larger "natural" occurring mammals, especially carnivores have been impacted by tall game fences within the surroundings, however within the property itself, cattle fences surrounding this grazing camp do not provide much hindrance for small and medium sized mammals. Most of the species recorded within this habitat type can be regarded as habitat generalists. The most frequently observed mammals include; Black-backed Jackal (*Canis mesomelas*), Single-striped Grass Mouse (*Lemniscomys rosalia*) and Slender Mongoose (*Herpestes sanguineus*).

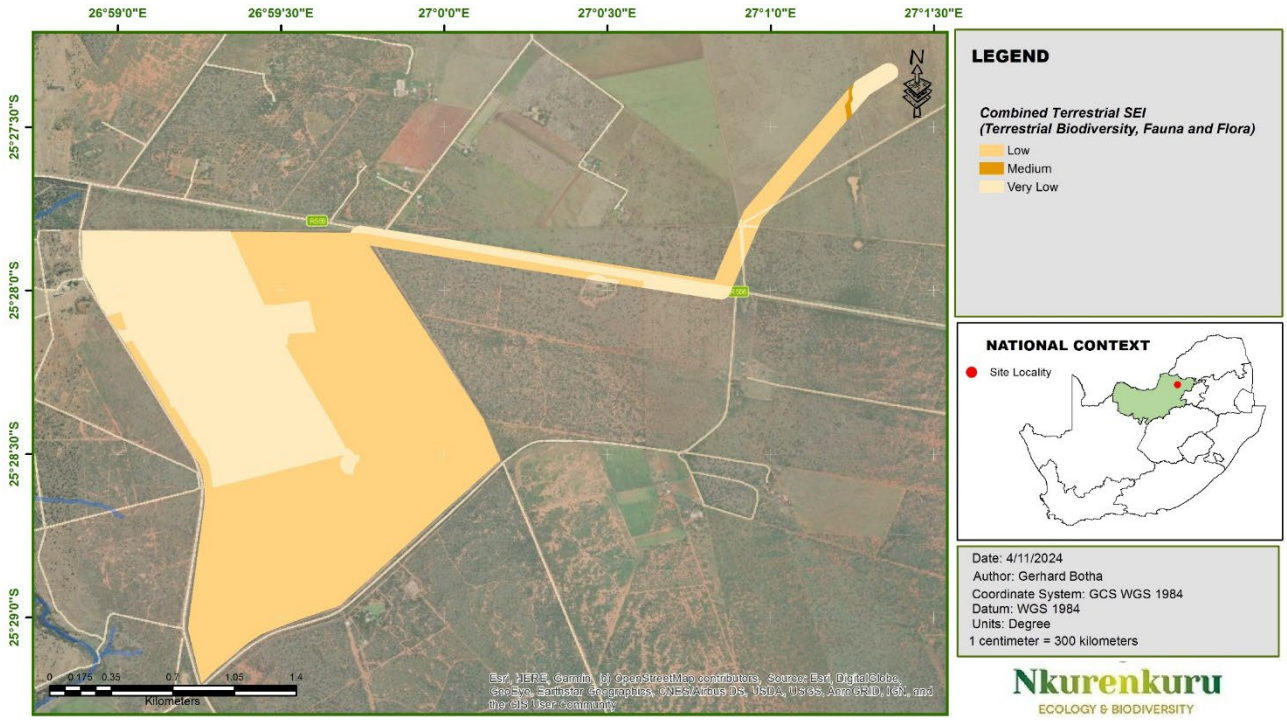
In terms of herpetofaunal diversity, this habitat type was found to be low in diversity with no reptile or amphibian species recorded within this habitat very limited, suitable habitat being available for amphibian species.

No animal SCC were recorded within this habitat and there is a low Likelihood of Occurrence (LoO) for animal SCC to inhabit or utilize this habitat for forage.

6.2.6.4 COMBINED SITE ECOLOGICAL IMPORTANCE AND SENSITIVITY (FLORA, FAUNA AND TERRESTRIAL BIODIVERSITY THEMES

Figure 6-7 below illustrate the sensitivities identified within the faunal, floral, and terrestrial biodiversity assessments.

FIGURE 6-7 MAPPING INDICATING THE COMBINED (TERRESTRIAL BIODIVERSITY, FAUNA AND FLORA) ECOLOGICAL IMPORTANCE AND SENSITIVITY FOR THE STUDY AREA



6.2.6.5 NATIONAL PROTECTED AREAS EXPANSION STRATEGY

Approximately 92 % of the project site is located within a NPAES Focus Area. This Focus Area (FA) can be regarded as a fairly significant potential conservation area as this FA links the Pilanesberg Nature Reserve with the Magaliesberg Biosphere Reserve.

When assessing the project site's significance within the context of its role and value in maintaining the designated focus area for future conservation, as well as enhancing landscape connectivity within this region, it becomes evident that the project site's contribution and value are relatively limited. The project site is positioned on the periphery of the focus area and lacks critical corridor attributes that would be essential for enhancing connectivity.

Moreover, substantial portions of the project site have undergone substantial modifications, and its proximity to existing road infrastructure further diminishes its ecological value. The project site's natural features, such as natural vegetation, or wildlife habitat, are largely fragmented and compromised due to previous human activities and land alterations. Consequently, the removal of the project site from the focus area is unlikely to exert a significant impact on the attainment of the conservation objectives outlined for the focus area, nor will it substantially diminish the focus area's potential as a crucial future conservation zone.

Subsequently, the focus area's primary conservation targets and goals are achievable without depending on the inclusion of this specific project site, as there are more suitable locations within the focus area to achieve those targets, and as such the loss of this area from the FA is deemed as acceptable.

In terms of South African Protected (SAPA) and South African Conservation (SACA) Areas, the site is not located within any SACAs and SAPAs. The project site is located approximately 11.8 km south of the northern reserve portion (main conservation area) of the Pilanesberg Nature Reserve, and 12.8 km south-west of the McGregor Private Nature Reserve. The project site is located well away from any SACA, with the closest SACAs being the Magaliesberg- and Marico Biosphere Reserves, located 21.8 km south of the proposed project site.

The proposed development won't have any impact on any protected- and/or conservation areas. Subsequently, the development is regarded, in terms of this systematic planning framework, as acceptable.

6.2.6.6 CRITICAL BIODIVERSITY AREAS AND BROAD SCALE ECOLOGICAL PROCESS

In terms of terrestrial Critical Biodiversity Areas (CBAs) the project site spans a combination of CBA2, ESA1, and ESA2 areas (Figure 6-9).

BIOLOGICAL CORRIDORS (SELECTED PLANNING UNITS AND CULTIVATED AREAS):

Provincial-level biodiversity network aimed at retaining connectivity between all geographic areas in the province.

- At 'n broad geographical scale this corridor, along with other corridors connects (directly) the Pilanesberg Nature Reserve with the Magaliesberg Biosphere Reserve, and indirectly with the Marico Biosphere Reserve (indirectly via a corridor between the two Biosphere Reserves) and furthermore, these corridors insure connectivity between these conservation/protected areas and important geographical features such as the Selons and Elands River valleys as well as the Crocodile River valley (the Elands River is an important tributary of the Crocodile River).
- At a smaller geographical scale this corridor ensures;

  - Longitudinal connectivity along the length of the Selons River;
  - Lateral connectivity between the Selons River and its associated wetlands.
  - Lateral connectivity between the Selons River and the surrounding terrestrial habitats; and
  - Connectivity between the Selons River and associated larger tributaries, as well, as mentioned, connectivity between this river and the Elands River and eventually with the Crocodile River.

All natural areas within this corridor are regarded as ESA1, whilst all non-natural areas are regarded as ESA2.

- T7 Corridors (selected planning units)
  - ESA 1 (Natural areas within Corridor): Approximately 271.9 ha (79%) ha of the Project Site.
  - ESA 2 (Non-Natural areas within Corridor): Approximately 70.6 ha (21%) of the Project Site.

- T11 Corridors (cultivated areas within the corridor)
  - ESA 2 (Non-Natural areas within Corridor): Approximately 7.2 ha (2%) of the Project Site.

Direct impact on these ESAs will be unavoidable, however, during the site visit it was found that a much larger extent, than indicated within the CBA map have been modified and/or transformed and subsequently these areas should be downgraded to ESA 2 areas. Based on the findings of the site visit:

- 31% (105.6 ha) of the project site has been seriously to critically modified and should rather be regarded as ESA 2;
- 8% (27.5 ha) of the project site has been completely modified/transformed and cannot be regarded as either ESA1 or ESA2.
- 58% (198.5 ha) of the project site has been moderately modified but is still capable of ecological functions of a natural ESA 1 and should therefore still be regarded as such.
- Only 3% (11.6 ha) of the project site can be regarded as large rely natural thornveld with minimal modifications.

The potential of this area to functions as a biological corridor has been severely impacted through agricultural practices. Due to extensive exotic game farming/breeding within the region, natural movement have been significantly impacted, within this corridor, as most of farms in the area (including the affected property) comprise of small game breeding camps cordoned off with high, impenetrable game fences, which also is regularly electrified. These wildlife breeding activities have resulted in significant fracturing of the landscape. Furthermore, historically, large areas have been subjected to extensive tree and shrub removal, ploughing, and subsequent reseeding with pasture grasses, all aimed at enhancing the grazing potential of the area. Follow-up, ripping and reseeding of localised areas within these pastures, occur at irregular intervals.

FIGURE 6-8 PRESENT ECOLOGICAL STATUS OF TERRESTRIAL HABITATS AS IDENTIFIED DURING THE SITE SURVEY

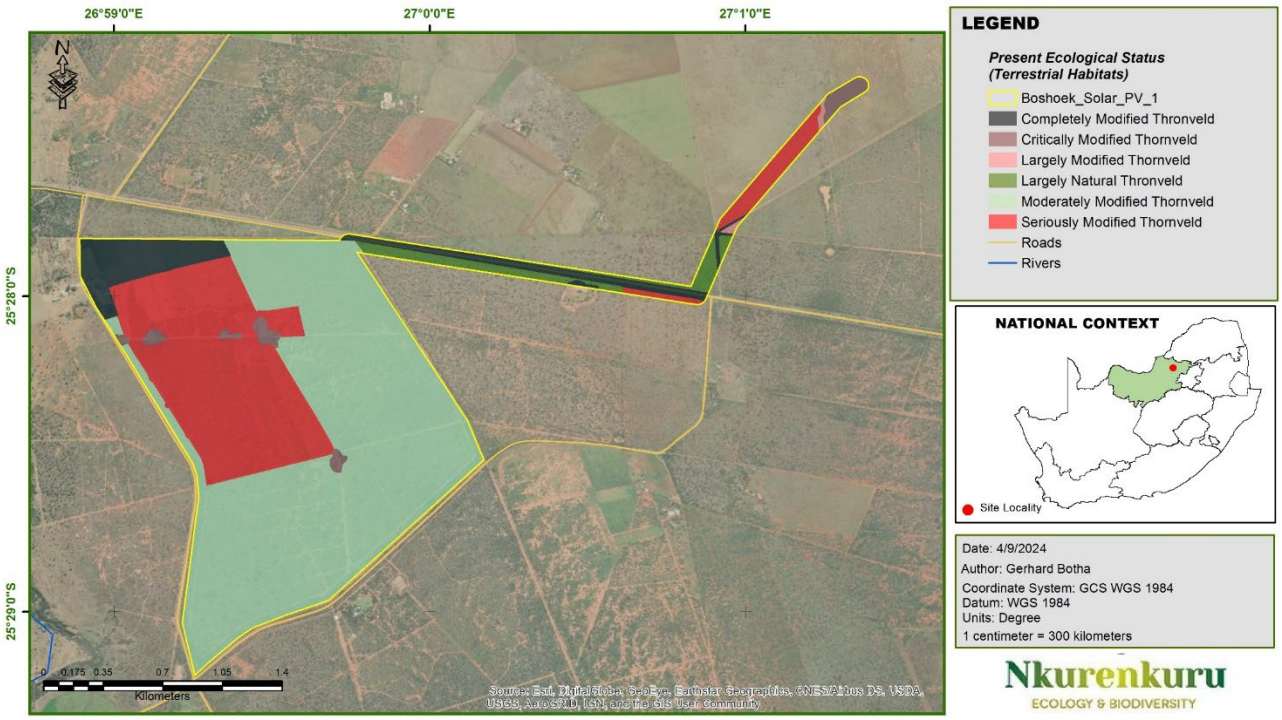
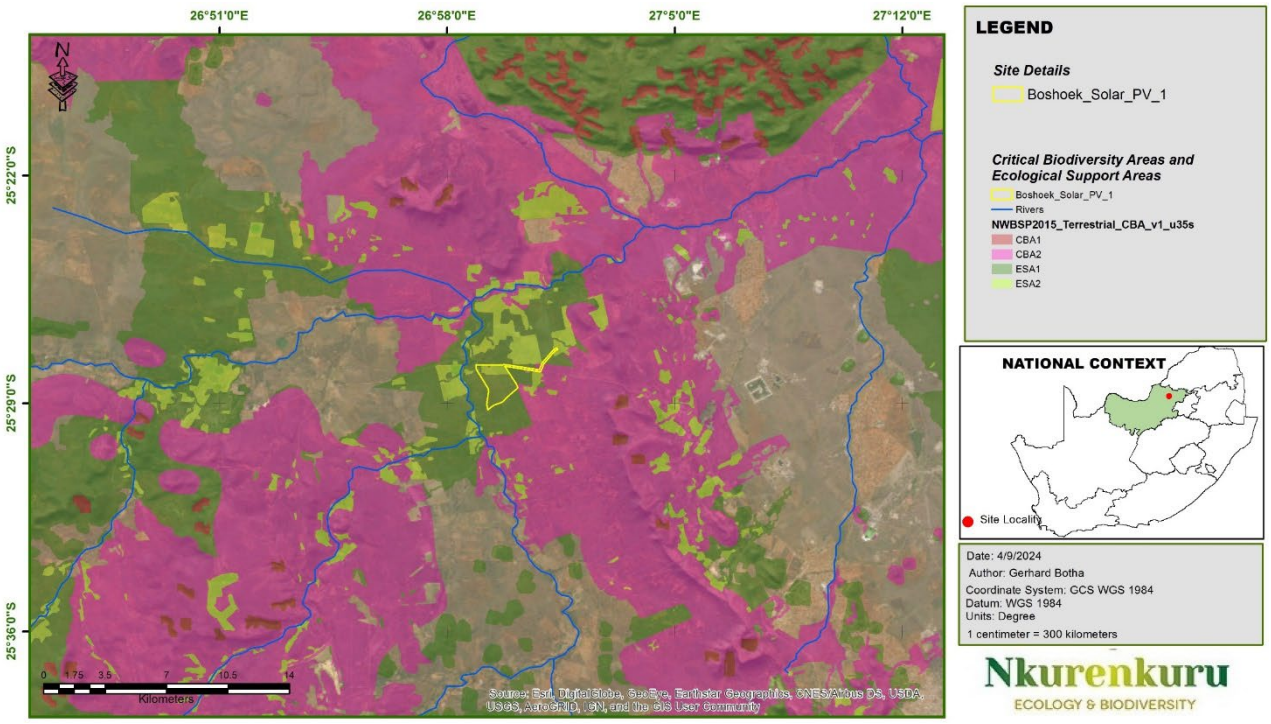


FIGURE 6-9 TERRESTRIAL CRITICAL BIODIVERSITY AREAS (CBAS) FOUND WITHIN THE GREATER SURROUNDINGS OF THE BOSHOEK SOLAR 1 PROJECT SITE



Within the project site, as mapped in the NW_CBA Map, 92% of the area, equivalent to 253 hectares, is designated as CBA2 (Corridor Node). However, based on the site survey, only 52% (141.7 hectares) of the project site contains sufficient natural elements to potentially function as part of the corridor node and provide adequate habitat for fauna. The remaining 40% of the project site, currently classified as CBA2, has undergone significant transformation and degradation. This degradation has compromised its ability to function as part of a corridor node, leading to the recommendation that these areas should be reclassified as ESA2, in accordance with the criteria for ESA2 designation.

The remaining 52% of the site, despite being closer to a natural state, also warrants re-evaluation. As discussed above, the proximity of the site to existing road infrastructure and agricultural activities has diminished its ecological value. The region's widespread exotic game farming and breeding have further fragmented the landscape, disrupting natural movement within the corridor. High, impenetrable, and often electrified game fences surrounding small breeding camps have exacerbated this fragmentation.

Given the relatively small size of the remaining natural vegetation within the potential impact area, its location within the corridor node (periphery of node near a busy road network), and the fragmented nature of the surrounding environment, this area may also be more appropriately classified as ESA rather than CBA2. Even if this small natural area retains its CBA2 designation, the loss of this area—constituting less than 2% of the total extent of the corridor node—is unlikely to significantly impact the conservation objectives or the overall integrity, functionality, and services provided by the remaining CBA2within the biodiversity node (outside of the project site).

This reclassification reflects the degraded condition of the area and acknowledges that its contribution to the overall conservation targets of the CBA2 corridor node is minimal. The downgrading of large portions of this site to ESA2 is a more accurate representation of its current ecological state and its limited role in maintaining regional biodiversity connectivity.

6.3 AVIFAUNA

A number of surrounding habitats are available to birds in the area which includes water resources, thorny bushveld and modified habitats. Very few if any vertical man-made structures exist in this landscape currently. The proposed project would therefore result in a significant change from the *status quo* for avifauna.

The South African Bird Atlas Project 2 (SABAP2) data indicate that 278 avifauna species are expected for the project area of influence (PAOI) and surrounding habitats. Twenty-two (22) of these are considered SCC and include those listed in Table 6-3. Eighty-six (86) of the 278 expected species were observed during the single site visit and only one SCC (Secretary bird - *Sagittarius serpentarius*) were observed during the initial investigation but were not previously recorded within the SABAP2 pentads.

TABLE 6-7 THREATENED AVIFAUNA SPECIES THAT ARE EXPECTED TO OCCUR WITHIN THE PROJECT AREA.

Common Name	Scientific Name	Regional*	Global+
Lanner Falcon	*Falco biarmicus*	Vulnerable (VU)	Least Concern (LC)
Greater Flamingo	*Phoenicopterus roseus*	Near Threatened (NT)	LC
African Marsh Harrier	*Circus ranivorous*	Endangered (EN)	LC
Marabou Stork	*Leptoptilos crumenifer*	NT	LC
Cape Vulture	*Gyps coprotheres*	EN	VU
Abdim's Stork	*Ciconia abdimii*	NT	LC
African Finfoot	*Podica senegalensis*	VU	LC
African Grass-Owl	*Tyto capensis*	VU	LC
Bateleur	*Terathopius ecaudatus*	EN	EN
Black Stork	*Ciconia nigra*	VU	LC
Blue Crane	*Anthropoides paradiseus*	NT	VU
Caspian Tern	*Hydropogne caspia*	VU	LC

Common Name	Scientific Name	Regional*	Global+
Curlew Sandpiper	*Calidris ferruginea*	LC	NT
European Roller	*Coracias garrulus*	NT	LC
Greater Painted-snipe	*Rostratula benghalensis*	NT	LC
Half-collared Kingfisher	*Alcedo semitorquata*	NT	LC
Kori Bustard	*Ardeotis kori*	NT	NT
Lappet-faced Vulture	*Torgos tracheliotos*	EN	EN
Lesser Flamingo	*Phoeniconaias minor*	NT	NT
Martial Eagle	*Polemaetus bellicosis*	EN	EN
Pallid Harrier	*Circus macrourus*	NT	NT
Pink-backed Pelican	*Pelecanus rufescens*	VU	LC

6.4 HERITAGE, ARCHAEOLOGY AND PALEONTOLOGY

The study area is located within the Zeerust Thornveld vegetation type, which is described as a deciduous, open to dense short thorny woodland, dominated by Acacia species with herbaceous layer of mainly grasses on deep, high base-status and some clay soils on plains and lowlands, also between rocky ridges of Dwarsbery-Swartruggens Mountain Bushveld.

Historical topographic maps (1:50 000) for various year (1963) were available for utilisation in the background study. These maps were assessed to observe the area's development and the location of possible historical structures and burial grounds. The study area was overlain on the map sheets to identify structures or graves situated within or immediately adjacent to the study area that could possibly be older than 60 years and thus protected under Section 34 and 36 of the NHRA. No potential heritage features were found.

A search of the SAHRIS database revealed that several previous archaeological and heritage impact assessments had been undertaken within the surroundings of the study area. This assessment has revealed that one previous study (MNGOMEZULU, M. 2015. Phase 1 Heritage Impact Assessment for Section 24G Rectification Process and Water Use License Application for the Chrome Crushing, Screening and Washing plant on Portion 8 of the Farm Boshoek 103 JQ in Rustenburg, Bojanala Platinum District Municipality, North West Province) was undertaken within the present study area, which identified one cemetery. At the time, the cemetery also consisted of four graves.

The Boshoek Solar 1 SEF is underlain by Quaternary superficial deposits, as well as the Silverton Formation (Pretoria Group, Transvaal Supergroup). The PalaeoMap of the SAHRIS indicates that the study area is underlain by sediments with a High (Silverton Formation) and Moderate (Quaternary deposits) Paleontological Sensitivity (Almond et al, 2013; SAHRIS website).

Updated geology produced by the Council for Geosciences in Pretoria indicates that the development is underlain by the alluvium, colluvium, eluvium, and gravel as well as the Silverton Formation of the Pretoria Group (Transvaal Supergroup).

The Quaternary surface deposits are the most recent geological deposits generated (from approximately 2.6 million years ago to the present). Majority of the surface deposits are unconsolidated sediments made up of clay, gravel, sand, and silt that create thin, discontinuous patches of sediment or broader stretches onshore. Beach sand, channel, floodplain, and stream deposits, talus gravels, and glacial drift sediments are among the sediments found within the study area.

The Precambrian Transvaal Supergroup is approximately 2550-2050 Ma old (Late Archaean to Early Proterozoic) and 15 km thick (Catuneanu et al. 1999). Sedimentary, volcanic, and unmetamorphosed clastic rocks make up this Supergroup. The mudrocks of the Silverton Formation overlie the sandstone-dominated Magaliesberg Formation, which in turn overlies the sandstone-dominated Daspoort Formation. The Silverton Formation is a lithologically diverse, mudrock-dominated sequence that was formed on an offshore shelf along the Kaapvaal Craton's boundaries (Eriksson et al. 1995; 1998; 2006, 2012). Volcanic ash-rich strata are widespread, as are small carbonate and chert levels. In the top half of the sequence, sandstones become more regular and were deposited in shallower circumstances. The Machadodorp Member, which sits in the centre of the Silverton Formation in the eastern Pretoria Basin, is distinguished by a prominent layer of volcanic rocks (including agglomerates, basaltic lavas, and tuffs). The existence of volcanic pillow lavas and water-lain tuffs indicates that they developed below the sea. The deep-water Silverton mudrocks were deposited at high sea levels and were followed by shallowing fluvial and deltaic sandstones of the overlying Magaliesberg Formation at low sea levels. Basaltic andesite and pyroclastic rocks make up the Hekpoort formation and is volcanic in origin.

The Transvaal Basin's Pretoria Group is made up of a variety of stromatolites (microbial laminates), ranging from supratidal mats to intertidal columns and huge subtidal domes (Eriksson et al. 2006). Stromatolites are sedimentary rocks that consist of layered mounds, columns, and sheet-like structures. Layer upon layer of cyanobacteria, a single-celled photosynthesizing microorganism, grew to build these formations. Cyanobacteria are prokaryotic cells, which are the most basic form of modern carbon-based life. Stromatolites are the earliest known fossils and were discovered in Precambrian strata. During the Archaean and Proterozoic eras, countless cyanobacteria photosynthesized, producing the oxygen atmosphere we have today.

During the fieldwork no heritage features were identified. Based on the Specialists assessment as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the overall development footprint for the solar facilities is rare. This is in contrast with the High Sensitivity allocated to the development area by the SAHRIS Paleosensitivity Map and DFFE Screening Tool.

6.5VISUAL / LANDSCAPE

Much of the study area comprises cultivated/grazing lands and remnants of the bushveld. The project site occurs across these types of landscapes.

The areas to the east and north of the study exhibit a high aesthetic appeal imparted by the hills associated with the end of the Magaliesberg Range. These areas are natural in character and

have a relatively high scenic quality, within the context of the sub region and consequently are sensitive to development. Development is not proposed in these areas.

The landscape is the backdrop against which all cultural activities (primarily agriculture, with game farming and some power infrastructure) occur and comprises a varied landscape which includes open agricultural grasslands and the remnants of the original savannah bushveld (Zeerust Thornveld – Mucina and Rutherford 2006:461). This savannah type comprises deciduous open to dense short thorny woodland, dominated by Vachellia (Acacia) species with an herbaceous layer of mainly grasses. The Selons River flows from south to north across the study area and is west of the project sites. See figure below Figure 6-10.

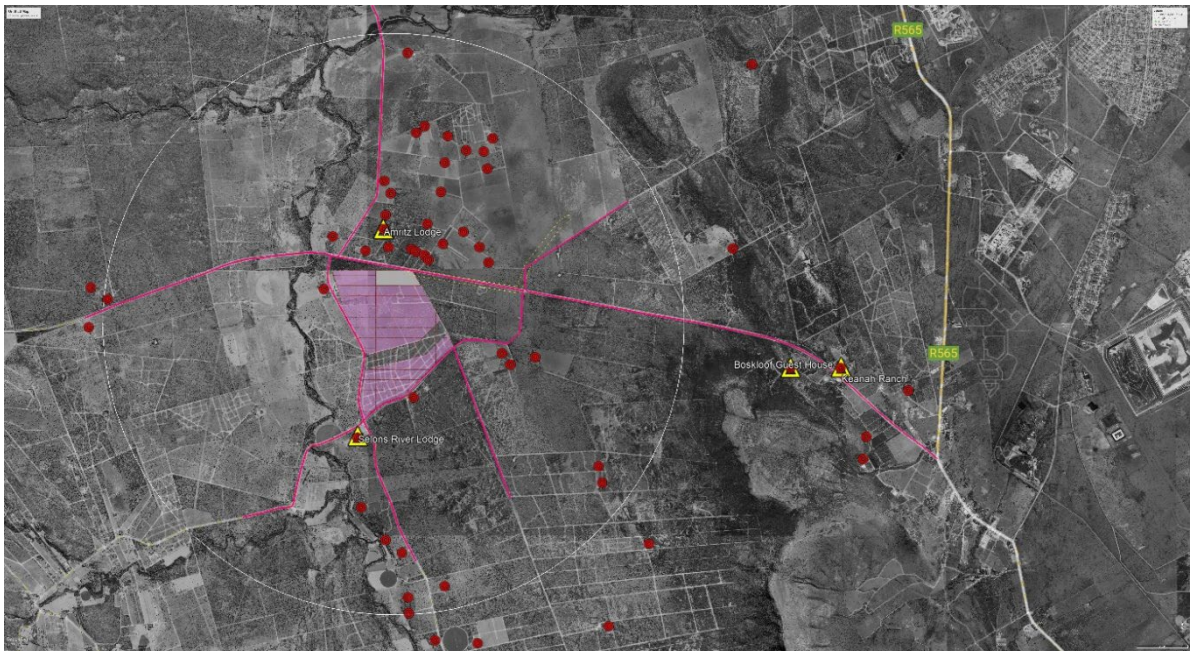
FIGURE 6-10 VIEW OF LANDSCAPE CHARACTER OF THE SITE.

:

6.6TRAFFIC AND TRANSPORTATION

During the field study, existing public roads were used that surrounded and crossed the study area to determine the potential visibility from these areas and nearby farmsteads. The route (pink lines) are indicated in Figure 6-11 below, along with homesteads (red dots), lodges (yellow triangle).

FIGURE 6-11 SITE VISIT ROUTE MAP WITH SENSITIVE RECEPTOR LOCATIONS



The road network within the study area, and majority of the access road will follow existing, gravel farm roads that may require widening up to 10 m (inclusive of storm water infrastructure). Where new sections of road need to be constructed (/lengthened), this will be gravel/hard surfaced access road and only tarred if necessary.

A network of gravel internal access roads and a perimeter road (cumulatively up to 33 km in length), each with a width of up to ± 6 m, will be constructed to provide access to the various components of the PV development.

6.7 SOCIO-ECONOMIC BASELINES

Most of the study area can be classified as rural with very low densities that makes the provision of basic services very difficult and expensive. The more formal urban areas are located in the southern side of the district. These include Rustenburg and Brits, which are vibrant economic nodes.

The Kgetlengrivier Local Municipality (LM) is a Category B municipality located in the south-eastern part of the North West Province and forms part of the BPDM. The LM is one of the five local municipalities found in the BPDM in the Northwest Province. It is located in the south-eastern parts of the province and is situated on the N4 national road that runs between Pretoria and Botswana, and towns that can be found in the municipality are Reagile, Borolelo and Koster.

6.7.1 POPULATION

The site proposed for the solar facility is located close to populated areas with the main economic nodes being: mining sites, which is ~7km from the site; and Sun City, a tourism hub, ~9km from the site. Thus, the direct project area is influenced by large economic drivers and populations centers are supported to some degree by these drivers.

There are several population centers surrounding the proposed area. To the North lies Phatsima, with Rasimone, Robega and Chaneng to the East. There settlements are generally small with populations around 5,000 to 7,000. Boshoek also to the east has a few small businesses servicing the area. The Boshoek central business district is located approximately 6 km from the project

area. The area is characterized by an Engen Garage, some retail stores, small- and large-scale businesses, and informal traders.

The mines and settlements in the area do make use of the tar road in the area; however, should not be overly impacted through the proposed project. The area is quite used to traffic, heavy vehicles travelling to and from the mines, as well as for agricultural use.

The Sundown Country Estate is roughly 4km to the east of the project site. The facility offers accommodation and leisure. A similar establishment, the African Elegance Tented Lodge is nearby, to the north. Several such small businesses in the form of accommodations, Bed and Breakfasts, Lodges and similar kinds are active in the area. These small businesses make an income by taking advantage of the location, the proximity to Pilanesberg National Park, the attractions of Sun City, the need for accommodation for people employed by the mines.

Kgetlengrivier LM has experienced an increase in population size. In 2016 there were 59,561 people, compared with the 51,049 people recorded in 2011. Kgetlengrivier LM experienced an annual population growth of 3.51% over this period.

6.7.2 HOUSEHOLDS AND HOUSE TYPES

In 2011, Rustenburg LM comprised 199,044 households and by 2016, the number had increased to 262,576, an increase of 63 532 households. Despite the increase, the average household size showed a decrease during the same period, dropping from 2.5 to 2.4. Kgetlengrivier LM had an increase of 4,114 households, going from 14,673 households in 2011 to 18,787 in 2016. The average household size in Kgetlengrivier LM has seen a slight increase from 3.1 in 2011 to 3.2 in 2016 (StatsSA, 2016).

The Community Survey 2016 indicated that households are headed by males throughout the provincial, district and municipal spheres. The Northwest province accounts for 809,219 (65%) male headed households, The BPDM accounts for 427,210 (70%), Rustenburg LM has 198,664 (76%), and Kgetlengrivier LM 13,152 (70%) male headed households. It can be concluded that the mining houses around the study area have created job opportunities that have enabled males to provide for their families (Community Survey, 2016).

There has been a significant decline in the number of people residing in informal dwellings/shacks. Rustenburg LM consists of 76,062 (29%) while Kgetlengrivier LM consists of 5,865 (31%) informal dwellings. This could be due to the distribution of RDP houses by government within these communities (Community Survey, 2016).

6.7.3 EMPLOYMENT

In the Kgetlengrivier LM, 45% people are economically active (employed or unemployed but looking for work), and of these, 12% are unemployed. Of the 9,142 economically active youths (between 15 – 34 years) in the area, 27% are unemployed.

Rustenburg LM accounted for 196,080 (49%) employed people, while 70,391 (18%) were unemployed. Most individuals are employed in the formal sector in both Rustenburg LM, which accounts for 147,924 (75%) people, and Kgetlengrivier LM, accounting for 7,575 (49%) people (Community Survey, 2016).

6.7.4 EDUCATION

There has been an increased number of individuals who have completed Grade 9 or higher in the related municipalities. Rustenburg LM counts 288,993 (71%) pupils, Kgetlengrivier LM counts 21,650 (62%) pupils, and 701,499 (68%) pupils in the DM. However, most of the population living in the study area likely have achieved a level of educational attainment less than matric (Community Survey, 2016).

7. ASSESSMENT OF ALTERNATIVE

In accordance with the requirements of Appendix 1 of the 2014 EIA Regulations (as amended), an assessment report must contain consideration of all alternatives, which can include activity alternatives, site alternatives, location alternatives and the "No Development" alternative. At a minimum, this chapter must address:

- The consideration of the No Development alternative as a baseline scenario;
- A comparison of reasonable and feasible selected alternatives; and
- The provision of reasons for the elimination of an alternative.

Alternatives are required to be assessed in terms of social, biophysical, economic and technical factors.

When assessing alternatives, they should be "practical", "feasible", "relevant", "reasonable" and "viable", and I&APs should be given the opportunity to provide input into the process of formulating alternatives. In this instance, this chapter provides a brief overview of the alternatives that have been considered for the scoping phase of this development.

7.1 THE NO DEVELOPMENT SCENARIO OR "NO-GO" OPTION

This scenario assumes that the proposed development does not proceed. It is equivalent to the future baseline scenario in the absence of the proposed development. Relative to the proposed development, the implications of this scenario include:

- The land-use remains agricultural, with no further benefits derived from the implementation of a complementary land use;
- There is no change to the current landscape or environmental baseline;
- No additional electricity will be generated on-site or supplied through means of renewable energy resources. This would have negative implications for the South African government in achieving its proposed renewable energy target, given the need for increased generation;
- There would be a lost opportunity for South Africa to generate renewable energy. This would represent a significant negative social cost;
- There is no opportunity for additional employment (permanent or temporary) in the local area where job creation is identified as a key priority; and
- The national and local economic benefits associated with the proposed project's REIPPPP commitments and broader benefits would not be realised.

The purpose of the proposed development is to generate renewable electricity and export this to the national grid. Other socio-economic and environmental benefits will result from the proposed development such as:

- Reduced air pollution emissions - burning fossil fuels generates CO2 emissions which contributes to global warming. Emissions of sulphurous and nitrous oxides are produced which are hazardous to human health and impact on ecosystem stability;
- Water resource saving – conventional coal-fired power stations use large quantities of water during their cooling processes. SEFs require limited amounts of water during construction and a minimal amount of water during operation. As a water stressed country, South Africa needs to be conserving such resources wherever possible;

- Improved energy security – renewables can be deployed in a decentralised way close to consumers, improving grid strength while reducing expensive transmission and distribution losses. Renewable energy projects contribute to a diverse energy portfolio;
- Exploit significant natural renewable energy resources – biomass, solar and wind resources remain largely unexploited; and
- Sustainable energy solutions – the uptake of renewable energy technology addresses the country's energy needs, generation of electricity to meet growing demands in a manner which is sustainable for future generations.

Employment creation and other local economic benefits associated with support for a new industry in the South African economy.

The 'No Development' alternative would not assist the government in addressing climate change, energy security and economic development.

Addressing climate change is one of the benefits associated with the implementation of this proposed development. Climate change is widely considered by environmental professionals as one of the single largest threats to the environment on a local, national and global scale.

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. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area.

There are no agricultural impacts of the no-go alternative. Even though the impacted land is not cropland, and the impact of the development is low, its negative agricultural impact is marginally 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 option would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of renewable energy in South Africa.

There are no Terrestrial Impacts of the no-go alternative. No "no-go" areas have been identified to date but the potential for alien invasive species present in or around the study area is regarded as moderate. The extent to which the site contains alien plants will be determined in the EIA phase through detailed investigation and field-survey.

The No-Development option would mean that the electricity generated through renewable sources, in this case solar energy, is not generated and fed into the national electricity grid. In the current socio-economic and policy context, the no-Development option would represent a negative outcome. Further, the employment opportunities associated with the project, as well as the direct and ancillary socio-economic benefits to the region would be forgone.

The DEAT 2006 guidelines on 'assessment of alternatives and impacts' proposes the consideration of four types of alternatives namely, the no-go, location, activity, and design alternatives. It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. As such, no alternatives were considered for this proposed development.

7.2 SITE SELECTION

The location of the proposed project is based on the preferred site of the developer. The following aspects were taken into consideration when selecting the location of the site:

- The selected location must be in close proximity to the existing Eskom infrastructure and interconnection points including substations;
- The site must be suitable open land for Solar PV development; and
- The screening process for the selected location must not identify exceedances of environmental sensitivities.

It is concluded, based on available information, that the Boshoek Solar 1 site is suitable for the construction and operation of the SEF. Additionally, there are no E&S fatal flaws associated with this site, and as such identification of alternative sites from an E&S perspective is not deemed reasonable.

7.3 TECHNOLOGY ALTERNATIVES

The Boshoek Solar 1 SEF will utilise solar PV technology to generate power. Solar energy is considered to be the most suitable renewable energy resource for this specific site, based on the locality of the site, ambient conditions and the availability of energy resources, which in this case would be solar irradiation.

PV technology is also preferred when compared to Concentrated Solar Power (CSP) technology because of the lower visual profile. A CSP has a high visual impact and requires large volumes of water; therefore, it is not considered a viable option for this project. A Solar PV is considered the preferred technology, and no other technology alternatives was considered for this project.

All technology alternatives will also have no bearing on the significance of agricultural impacts. All will have equal impact and are assessed as equally acceptable.

7.4 DESIGN EVOLUTION ALTERNATIVES

It is anticipated that the space available at the PV Site will be adequate to position the facility and its associated infrastructure to avoid areas of sensitive environmental features, which will be determined in the EIA Phase through the specialist studies. A preliminary layout was produced showing suggested locations of Solar PV panels and associated infrastructure on the site. This layout will be adjusted, based on the initial scoping assessment and specialists' findings.

The exact nature and layout of the different infrastructure within the boundary fence of a SEF has absolutely no bearing on the significance of agricultural impacts. Any alternative layouts within the boundary fence will have equal impact and are assessed as equally acceptable.

8. THE PREFERRED ALTERNATIVE

The Boshoek Solar 1 will consist of the components listed 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 design phase prior to construction (subsequent to the issuing of an EA, should such an authorisation be granted), but that the information provided below is seen as the worst-case scenario.

Boshoek Solar 1 SEF and Grid Connection components: – 150 MW

- PV modules (mono- or bifacial) and mounting structures;
- Inverters and transformers;
- Battery Energy Storage System (BESS);
- Site access road;
- Internal access roads;
- Auxiliary buildings (switch room, gatehouse and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);
- Temporary and permanent laydown area, and
- Grid connection infrastructure, including:
  - Underground medium-voltage cabling between the project components and the facility substation;
  - Up to 132 kV facility on-site substation;
  - Up to 132 kV on-site switching station;
  - A single circuit 132 kV power line from the switching station to the future planned Eskom collector switching station ~3.5 km north-east of the site.

The proposed development will include a total permanent development footprint of up to 290 ha.

8.1 SOLAR FACILITY COMPONENTS

It should be noted that because the design of the proposed development is not yet finalised, all dimensions are maximums (i.e. – worst case scenario) as is required by the EIA process. The final design may include infrastructure, which is of equal or less than dimensions to those stated below, but not more than.

8.1.1 PV TECHNOLOGY

PV technology produces direct current (DC), which is converted to alternating current (AC) via power electronic inverters. PV cells are made from semi-conductor materials that are able to release electrons when exposed to solar radiation. This is called the photo-electric effect. Several PV cells are grouped together through conductors to make up one module. Modules can be connected together to produce power in large quantities. In PV technology, the power conversion source is via PV modules that convert light directly to electricity.

Solar panels produce DC electricity; therefore, PV systems require conversion equipment to convert this power to AC, that can be fed into the electricity grid.

8.1.2 BATTERY ENERGY STORAGE SYSTEM

The BESS will be placed on a concrete footprint of up to 5 ha. The function of the BESS will be to store peak kinetic energy produced by the Boshoek Solar 1 SEF for use in the following ways:

- To power the operation of the proposed development when the national grid is strained by high (or peak) demand, often resulting in load-shedding;
- To provide excess generation to the national grid which will assist with stabilizing electricity supply during peaks and troughs of demand; and
- To reduce the impact caused by the variability and limited predictability of solar energy generation.

The preferred battery technology being considered would be Solid-State, e.g. Lithium Ion (Li-Ion) batteries, which consists of multiple battery cells that are assembled together to form module. Each cell contains a positive electrode, a negative electrode and an electrolyte. A module may consist of thousands of cells working in conjunction. Modules are normally packaged inside containers (similar to shipping containers) and these containers are delivered pre-assembled to the project site.

The containers are raised slightly off the ground and are bunded to prevent possible environmental damage resulting from any equipment malfunction.

The BESS will be located in close proximity to the on-site switching station, will be fenced off and will be linked to the substation via internal cables and will not have any additional office / operation / maintenance infrastructure as those of a substation.

FIGURE 8-1 TYPICAL REPRESENTATION OF HOW BATTERIES AND BATTERY MODULES ARE HOUSED AND ASSEMBLED

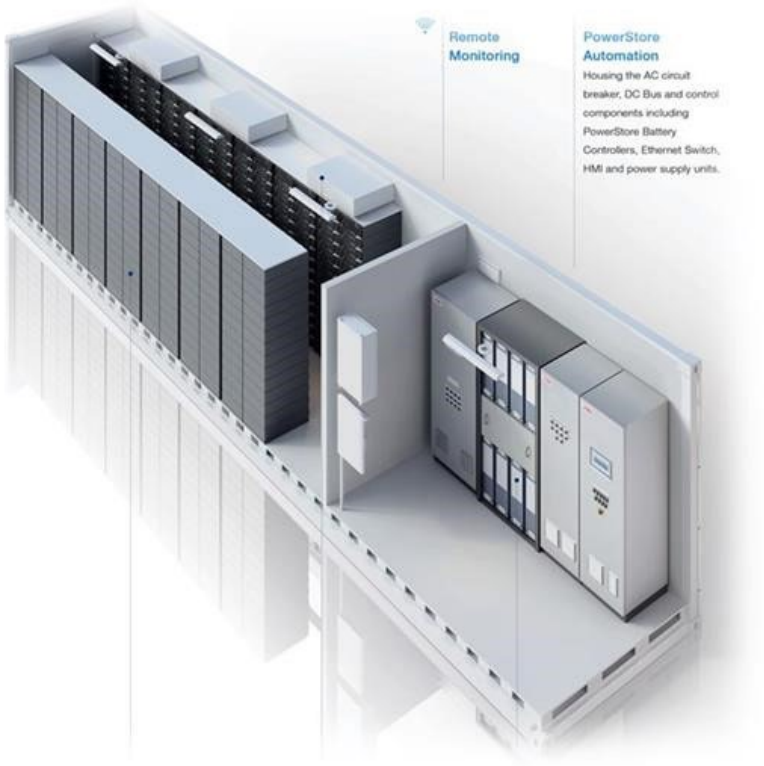


FIGURE 8-2 A STOCK IMAGE OF A SIMILAR DEVELOPMENT WITH AN ON-SITE SUBSTATION AND BESS

8.1.3 OPERATIONS AND MAINTENANCE (O&M) BUILDING

An area of up to 1 ha will be occupied by buildings, which will include (but not limited to) a 33 kV switch room, a gate house, ablutions, workshops, storage and warehousing areas, site offices and a control center.

8.1.4 INTERNAL SITE ACCESS ROADS

Most of the access road will follow existing, gravel farm roads that may require widening up to 10 m (inclusive of storm water infrastructure). Where new sections of road need to be constructed (lengthened), this will be gravel/hard surfaced access road and only tarred if necessary.

A network of gravel internal access roads and a perimeter road (cumulatively up to 33 km in length), each with a width of up to ~ 6 m, will be constructed to provide access to the various components of the PV development.

Site access is proposed directly off an unnamed gravel road surrounding the site; however, this will be confirmed based on the outcome of the traffic impact assessment.

8.1.5 ELECTRICAL CABLING AND ON-SITE SUBSTATION

Medium-voltage (MV) cables internal to the SEF will be entrenched and located adjacent to the access roads and /or within the footprint of the internal roads to an on-site substation.

The facility substation and Eskom switching station will be 1 ha each, and will include switchgear portals up to 15 m in height and lightning masts up to 25 m in height.

8.2 SERVICE PROVISION

8.2.1 HEALTH AND SAFETY

The IFC guidelines for Health and Safety are based on the Occupational Health and Safety (OHS) Act of America and are subsequently aligned with South African legislation (OHS Act No 85 of 1993). It is understood that the project infrastructure and equipment will be designed to good industry standards to minimise potential risks for personnel working at the proposed development site.

Boshoek Solar 1 (Pty) Ltd must develop a Health and Safety (H&S) Plan prior to construction, for all persons working at the proposed development site. The plan will need to evaluate the risks and impacts to the H&S of the affected community during the design, construction and operation of the proposed development, and establish preventive measures to address them in line with the identified risks and impacts in this assessment. Such measures need to adhere to the precautionary principle for the prevention or avoidance of risks and impacts over minimization and reduction.

8.2.2 WATER REQUIREMENTS

Water will be sourced from either the Local Municipality, supplied from a contractor and trucked in, from existing boreholes located within the application site or from a new licensed borehole (if feasible) if none of these options are available. Note, however, that should municipal water supply not be confirmed, the Applicant will investigate other water sources considering any necessary and relevant legal requirements.

Water will be utilized throughout both the construction and operational phases of Boshoek Solar 1 SEF 1. The anticipated water usage for the proposed project for the duration of the construction phase includes the following:

- Drinking;
- Ablution facilities;
- Access Road construction;
- Dust suppression;
- Fire-fighting reserve;
- Cleaning of facilities;
- Cleaning of panels; and
- Construction of foundations for the SEF infrastructure, i.e., PV panels and substation, etc.

Throughout operations, water will be essential for cleaning PV panels for human consumption and for various purposes in auxiliary buildings such as office spaces and ablution facilities.

8.2.3 PANEL CLEANING

During operation, water will be required for the cleaning of panels. The cleaning process will strictly utilize clean water (without any cleaning products) or non-hazardous biodegradable cleaning products. Wastewater produced from panel washing will either be gathered and reused for subsequent cleaning sessions or, if an environmentally friendly, non-hazardous biodegradable cleaning product is employed, allowed to runoff beneath the panels.

8.2.4 STORMWATER MANAGEMENT

Stormwater drainage systems will be constructed and kept separate from the sewerage effluent system on site to ensure that stormwater run-off from site is appropriately managed. Water from these systems is not likely to contain any chemicals or hazardous substances and will be released into the surrounding environment based on the natural drainage contours.

Wastewater and sludge will be managed by local authorities and service providers. All waste water will be handled in accordance with the *Guidelines for the Utilisation and Disposal of Wastewater Sludge Volumes 1 to 6 (Herselmann & Snyman, 2006).*

A project specific stormwater management plan will be produced and will be included in the EMPr (Appendix B) for implementation.

8.2.5 WASTE

During the construction phase, it is estimated that the SEF would generate solid waste which includes (but is not limited to) packaging material, building rubble, discarded bricks, wood, concrete, plant debris and domestic waste. Solid waste will be collected and temporarily stockpiled within designated areas on site during construction, and thereafter removed and disposed of at a nearby registered waste disposal facility on a regular basis as per agreement with the local municipality. Where possible, recycling and re-use of materials will be encouraged.

During the operational phase, the SEF will typically produce minor quantities of general non-hazardous waste mainly resulting from the O&M and office areas. General waste will be collected and temporarily stockpiled in skips in a designated area on site and thereafter removed and disposed of at a nearby registered waste disposal facility (or registered landfill) on a regular basis as per agreement with the local municipality. Where possible, recycling and re-use of materials will be encouraged.

Any hazardous waste such as chemicals or contaminated soil as a result of spillages, which may be generated during the construction and operational phases, will be temporarily stockpiled within a designated area on site and thereafter removed off site by a suitable service provider for safe disposal at a registered hazardous waste disposal facility.

8.2.6 SEWAGE

The SEF will require sewage services during the construction and operational phases. Low volumes of sewage or liquid effluent are estimated during both phases. 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 registered contractor on a regular basis.

The Applicant may consider a conservancy tank system which will be employed on site during the operational phase for which a registered company will be contracted to store and transport sewage from site to an appropriate municipal wastewater treatment facility.

8.2.7 ELECTRICITY FOR CONSTRUCTION PHASE

Electricity on site will be from on-site diesel generators as well as sourced from the national grid distribution networks.

8.2.8 EMPLOYMENT

In addition to the workforce required during the construction phase (up to 500), the Project is anticipated to require an additional 50 staff during the operational phase of the Project.

8.3 SUMMARY OF PROJECT INFORMATION

TABLE 8-1 SUMMARY OF SEF TECHNICAL DETAILS

SEF Technical Details Components	Description/Dimensions
Maximum Generation Capacity	Up to 150 MW
Type of technology	Onshore Solar
Development Footprint	290
Operations and maintenance buildings (O&M building) with parking area	1 ha which will include (but not limited to) a 33 kV switch room, a gate house, ablutions, workshops, storage and warehousing areas, site offices and a control center.
Site Access	Site access is proposed directly off an unnamed gravel road surrounding the site; however, this will be confirmed based on the outcome of the traffic impact assessment.
Area occupied by inverter transformer stations/substations	Up to 132 kV on-site facility substation and switching station
Capacity of on-site substation and switching station	Up to 132 kV
Battery Energy Storage System footprint	up to 5 ha
Length of internal roads	up to 33 km
Width of internal roads	up to 6 m
Proximity to grid connection	A single circuit 132 kV power line from the switching station to the future planned Eskom collector switching station ~3.5 km north-east of the site.
Internal Cabling	Medium voltage cables (up to 33 kV)
Height of fencing	Up to 3.5 m
Type of fencing	Where site offices are required, temporary screen fencing used to screen offices from the wider landscape.

TABLE 8-2 DEVELOPMENT AREA GEOGRAPHIC COORDINATES – BOSHOEK 1 SEF

Proposed Boshoek 1 SEF Site Boundary and Associated Infrastructure		
Aspect	Latitude	Longitude
Centre Point	25° 28’ 26.74”	26° 59’ 24.39”
North West corner	25° 27’ 49.54”	26° 58’ 55.96”
North East corner	25° 27’ 49.65”	26° 59’ 45.11”

Proposed Boshoek 1 SEF Site Boundary and Associated Infrastructure		
South East corner	25° 28’ 31.56”	26° 0’ 9.48”
South West corner	25° 29’ 12.11”	26° 59’ 15.22”
Proposed Boshoek 1 SEF BESS Co-ordinates		
North East Corner	25°27'49.14"S	26°59'41.68"E
North South Corner	25°27'57.43"S	26°59'41.72"E
South West Corner	25°27'57.53"S	26°59'34.80"E
North West Corner	25°27'48.88"S	26°59'34.73"E
Proposed Boshoek 1 SEF Powerline Route Co-ordinates		
Reference 1	25°27'51.63"S	26°59'44.91"E
Reference 2	25°28'2.09"S	27° 0'51.30"E
Reference 3	25°27'47.43"S	27° 0'57.12"E
Reference 4	25°27'27.00"S	27° 1'15.95"E
Reference 5	25°27'21.73"S	27° 1'22.28"E
Proposed Boshoek 1 SEF Laydown Area Co-ordinates		
North East Corner	25°27'50.78"S	26°59'34.57"E
North South Corner	25°27'57.70"S	26°59'34.66"E
South West Corner	25°27'57.30"S	26°59'27.68"E
North West Corner	25°27'50.85"S	26°59'27.75"E

9. PUBLIC PARTICIPATION PROCESS

9.1 INITIAL PROCESS

The first stage of public consultation was undertaken during the initial notification phase prior to the completion and public review of the Draft Scoping Report. On the 20 September 2023, advertisements were placed in the town of Boshoek, Rustenburg and Silverkrans; site notices were erected on the site; and written notices were sent out to the affected landowners, surrounding landowners and occupiers of the site as well as to key stakeholders and organ of state. The objective of this phase was to inform the National, Provincial and local Government Authorities, relevant public, private sector entities, NGOs and local communities about the project and capture their initial views and issues of concern that is important for the formulation of a plan of study and to allow the public to register as I&APs.

Following the initial notification phase, notification letters were sent to all I&APs informing them of the availability of the draft scoping report for public review and comment, which took place for a period of 30-days from the 26 February 2024 to 28 March 2024 (both days inclusive).

All issues raised during the initial notification and scoping phase has been taken into consideration and included in the EIA report. Volume II contains the Comments and Response Report which addresses all Interested and Affected Parties (I&APs) comments received to date Volume III – Public Participation Report, expands on the PPP conducted to date.

The primary aims of the public participation process (PPP) are:

- To inform I&APs of the proposed development;
- To identify issues, comments and concerns as raised by I&APs;
- To promote transparency and an understanding of the project and its potential consequences;
- To assist in identifying potential environmental (biophysical and socio-economic) impacts associated with the proposed development; and
- To ensure that all I&AP issues and comments are accurately recorded, addressed and documented in the comments and responses report.

9.2 EIA PHASE PUBLIC PARTICIPATION

During the EIA phase the following tasks were undertaken for public participation during 03 July 2024 until the 05 August 2024 (both days inclusive):

- Notification letters were sent out to registered I&APs, key stakeholders, and organs of state to inform them of the availability of the DEIAR for review and comment (30 days); and
- The CRR has been updated, comments and/or queries received have been recorded and the responses provided.

Furthermore, I&APs have been able to register on the I&AP database throughout the duration of the EIA process and registered I&APs have been informed about the progress of the application.

The public participation in the EIA phase had the following objectives:

- Inform I&APs about the EIA process followed to date;

- Present the specialist studies undertaken, impacts and proposed mitigation measures;
- Present the results of the Environmental Impact Assessment; and
- Collect concerns and expectations and take them into consideration in the EIA.

Details of the above information is attached in a public participation report (Volume II).

Actions still to be undertaken during the EIA phase are:

- Notification letters to all registered I&APs, key stakeholders, and organs of state to inform them of the decision by the DFFE and the appeal procedure; and
- Placement of advertisements in the same local and regional newspapers to inform I&APs of the decision taken by the DFFE.

9.3 SUMMARY OF COMMENTS

Initial Scoping Phase

During the initial notification phase, no comments / queries / questions / concerns were received from I&APs.

Scoping Phase

During the DSR PPP, comments were received from the DFFE, Biodiversity and Conservation, SAHRIS, CAA, DWS, DALRRD, other authorities and I&APs. Follow-up e-mails were sent to all registered I&APs, stakeholder and authorities, and no further comments were received.

EIA Phase

During the EIA phase comment was received from the DFFE, other authorities and I&APs. Responses to comments received during the scoping and EIA phases are provided in Section 6, Table 6.1 of the PP Report (Volume III), with EAP / specialist / applicant responses, and the original comments and responses have been appended to the PP report (Appendix 6).

10. ASSESSMENT OF POTENTIAL IMPACTS

10.1 SOIL, LAND USE AND AGRICULTURAL POTENTIAL

It should be noted that an Agricultural Compliance Statement is not required to formally rate agricultural impacts by way of impact assessment tables.

The most significant agricultural impact possible, is the loss of a large area of high yielding cropland and the least significant impact is the loss of a small area of low carrying capacity grazing land.

The production potential of the proposed Project Site land is limited to only being suitable as grazing land, and there is no scarcity of such land in the country. This is in contrast to arable land, which is very scarce. Using this land for solar power generation will cause minimal loss of agricultural production potential in terms of national food security.

At a farming level, the development will provide a positive economic impact. The income generated by the farming enterprises through the lease of the land to the energy facility is highly likely to exceed the potential agricultural income from the site. It will diversify the farm's income sources and provide reliable and predictable income that is independent of variable agricultural economic factors such as weather, agricultural markets and agricultural input costs. This is likely to increase cash flow and financial security and may improve farming operations and productivity on other parts of the farm or properties owned by the same farmer, through increased investment into farming.

With regards to the agricultural impacts of the proposed overhead power line, all possible agricultural activities can continue entirely unhindered underneath the power line. The direct, permanent, physical footprint that has any potential to interfere with agriculture (pylon bases and servitude track, where it is needed, is insignificantly small. The only potential source of impact of the power line is minimal disturbance to the land (erosion and topsoil loss) during construction and decommissioning. This impact can be completely prevented with standard, generic mitigation measures that are all inherent in the project engineering and/or are standard, best-practice for construction sites, and are included in the EMPr. The power line development will result in negligible loss of future agricultural production potential and its agricultural impact is therefore assessed as being of very low significance.

Generic mitigation measures that are effective in preventing soil degradation are all inherent in the project engineering and/or are standard, best-practice for construction sites.

A system of storm water management, which will prevent erosion on and downstream of the site, will be an inherent part of the engineering design on site.

Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 30 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-filled, the topsoil must be back-filled last, so that it remains at the surface. Topsoil should only be stripped in areas that are excavated. Across the majority of the site, including construction lay down areas, it will be much more effective for rehabilitation, to retain the topsoil in place. If levelling requires significant cutting, topsoil should be temporarily stockpiled and then re-spread after cutting, so that there is a covering of topsoil over the entire cut surface. It will be advantageous to have topsoil and vegetation cover below the panels during the operational phase to control dust and erosion.

For the power line, there are no additional mitigation measures required, over and above what has already been included in the Generic Environmental Management Programmes (EMPr's) For The Development and Expansion For Overhead Electricity Transmission And Distribution Infrastructure as per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019.

10.2 FRESHWATER AND WETLANDS (AQUATICS)

The proposed development footprint of the PV Solar Facility and associated infrastructure (apart from the associated Grid Infrastructure) are located outside of any freshwater resource features. As such, potential impacts associated with the construction, operation and decommissioning phases are very similar, with activities potentially leading to a small increase in water input and a potential indirect loss of / or damage to nearby/downslope freshwater resource features.

For the associated EGI infrastructure, the proposed grid corridor will cross a single narrow stream and subsequently the watercourse will likely be spanned by the power line and crossed by a service road.

10.2.1 CONSTRUCTION PHASE

SEFs require an initial high intensity disturbance of a fairly large surface area including the clearance of the vegetation cover and the levelling of earth on different terraces where necessary and the compaction of local soil within the development footprint. Concrete foundations for the framework on which the PV panels will be mounted. Soil disturbance, vegetation clearance and hardened surfaces will also be associated with the construction of access and internal roads within the PV solar facility. Electrical grid infrastructure would also need to be constructed within the site. Temporary laydown and storage areas would need to be placed within the site for the construction works.

In terms of the delineated aquatic features, the current layout of the PV solar field will avoid construction within any freshwater resource feature, however the development will still none the less occur in fairly close proximity to such freshwater resource features. In terms of the electrical grid infrastructure, a single freshwater resource feature will be crossed. Subsequently, according to the current layout of the proposed development, potential impacts on these freshwater resource features will mostly be of an indirect nature apart from the construct of the electrical grid line which may lead to some minor directs impacts.

However, the electrical grid line component of the development typically only requires an initial high intensity disturbances and vegetation clearance within a fairly small surface areas around the pylon locations. Disturbances and vegetation clearance within the remainder of the servitude (right of way) will be minimal and mostly restricted to the twin tracks/service routes. Due to the fact that pylons can span watercourses/wetlands without any placement of pylons within the watercourses themselves, direct impacts relating to the construction of the pylons are also potentially avoidable/unlikely. However, during the spanning process some direct impacts/damage may occur to the watercourse/wetland vegetation, however this is expected to be minimal. The most likely direct impact to the delineated freshwater resource feature (to be spanned) will be as a result of watercourse crossings, especially if new crossings will have to be created.

Impacts that may occur during the construction phase of this development may include:

- The increase in surface runoff and sediments carried into these freshwater resource features, subsequently potentially impacting local hydrological character of these wetlands (e.g. water quality and hydro-geomorphological character).
- Change in vegetation structure and composition due a change in the hydro-geomorphological character (increase in inundated area and the permanent and seasonal saturated zones, to the cost of the temporary saturated zone.
- The potential spread of erosion from the source (within the development footprint area), into the wetland features, subsequently disturbing wetland soils, vegetation cover and local biota.

There is also the potential for some water quality impacts associated with the batching of concrete, from hydrocarbon spills or associated with other construction activities on the site. Only a limited amount of water is utilised during construction for the batching of cement and other construction activities.

Generally, with mitigation measures in place, including the micro-placing of infrastructure, outside of any sensitive features (freshwater resource features and associated buffer areas), impacts will be localised, short-term and of low intensity and is expected to have a moderate-low to low overall significance in terms of its impact on the identified aquatic ecosystems in the area.

CONSTRUCTION PHASE

Impact on freshwater resource systems through the increase in surface runoff on form and function during the construction

The proposed PV Solar Project will involve the addition of hardened areas through the establishment of solar panel foundations while some compaction of soils may occur due to site works. Service roads have the potential to further increase areas of hardening as do the temporary construction area. The substation, hardened areas around the pylons and additional support buildings will increase hardened surfaces. The aforementioned will increase the runoff generated on site due to the addition of areas of hard surfaces and could lead to the alteration in the quantity, timing and distribution of water inputs into the downstream freshwater resource features, increased flood peaks downstream with increased flood risk and erosion risk, potentially reducing or disturbing important/sensitive downstream freshwater resource habitats.

Possible ecological consequences associated with this impact may include:

- Deterioration in freshwater ecosystem integrity.
- Reduction/loss of habitat for aquatic dependent flora & fauna; and
- Reduction in the supply of ecosystem goods & services.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Medium	Negative	High	Medium	High
With Mitigation	Low	Medium	Low	Neutral	Medium	Medium	High
Can the impact be reversed?			Partially Reversible. Through a rehabilitation and revegetation program which will be implemented during the decommissioning phase.				

CONSTRUCTION PHASE	
Will impact cause irreplaceable loss or resources?	With the implementation of mitigation measures there will not be any irreplaceable loss of freshwater recourses.
Can impact be avoided, managed or mitigated?	The impact can be largely mitigated and, in some areas, completely avoided (see mitigation measures below).

Mitigation measures to reduce residual risk or enhance opportunities:

- All watercourse features and their associated buffer areas should be regarded as No-Go areas for all construction activities, apart from the spanning of the electrical grid line and the use/upgrade of watercourse crossings along the electrical grid corridor.
- The recommended buffer areas between the delineated freshwater resource features and proposed project activities should be maintained.
- Vegetation clearing within the development footprint to be kept to a minimum. No unnecessary vegetation to be cleared.
- Vegetation clearing should occur in in a phased manner to minimise erosion and/or run-off.
- Infrastructure footprint and associated area of disturbance should be minimised as far as practically possible.
- Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities
- Stormwater from the substation and hard stand areas, must be managed using appropriate channels and swales when located within steeper areas.
- The runoff should be dissipated over a broad area covered by natural vegetation or managed using appropriate channels and swales.
- Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any storm water leaving the Solar PV site.
- The existing road infrastructure should be utilised as far as possible to minimise the overall disturbance.
- Where new roads need to be constructed, the existing road infrastructure should be rationalised and any unnecessary roads decommissioned and rehabilitated to reduce total area of hardened, bare areas within the property.
- No stormwater runoff must be allowed to discharge directly into freshwater resource features along roads, and flows should thus be allowed to dissipate over a broad area covered by natural vegetation.

Residual impact	A slight increase in water input (quantity), however, with mitigation measures in place this increase in water input would not impact the general hydrological characteristics of the downslope freshwater resource features.

CONSTRUCTION PHASE

Increase in sedimentation and erosion.

For the construction phase this refers to the alteration in the physical characteristics of freshwater resource features as a result of increased turbidity and sediment deposition, caused by soil erosion and earthworks, within the watercourse features' catchments, that are associated with construction activities. Possible ecological consequences associated with this impact may include:

- Deterioration in freshwater ecosystem integrity; and
- Reduction/loss of habitat for aquatic dependent flora & fauna.

This may furthermore, influence water quality

The proposed development will require clearing of existing vegetation and disturbance of soils, specifically for the installation of foundations for PV modules, access roads, electrical cabling, substation, buildings, and laydown areas. The solar panels will increase shading of the surface and may result in a decrease in vegetation cover. Disturbed or exposed soils will increase the likelihood of soil erosion and

CONSTRUCTION PHASE

subsequent potential sedimentation of downstream water courses during significant rainfall events. The study by Cook and McCuen (2013) found that the runoff from individual solar panels resulted in greater kinetic energy which increased potential soil erosion below panels (this potential erosion may be enhanced by panel maintenance which includes regular washing). The site is, however, located in a low rainfall area of South Africa which will reduce the potential impact with the mild topography also reducing the erosivity of runoff.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	High
With Mitigation	Low	Low	Low	Negative	Low	Low	High
Can the impact be reversed?			Largely reversible, with the implementation of appropriate mitigation measures.				
Will impact cause irreplaceable loss or resources?			No irreplaceable loss of freshwater resource features with the implementation of appropriate mitigation measures.				
Can impact be avoided, managed or mitigated?			The impact can be avoided (see mitigation measures below).				

Mitigation measures to reduce residual risk or enhance opportunities:

- All wetland features and their associated buffer areas should be regarded as No-Go areas for all construction activities apart from the spanning of the electrical grid line and the use/upgrade of existing watercourse crossings.
- The recommended buffer areas between the delineated freshwater resource features and proposed project activities should be maintained.
- Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.
- Vegetation clearing should occur in in a phased manner to minimise erosion and/or run-off.
- Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- All bare areas, as a result of the development, should be revegetated with locally occurring species, to bind the soil and limit erosion potential.
- Site rehabilitation should aim to restore surface drainage patterns, natural soil, and vegetation as far as is feasible.
- An erosion control management plan should be utilised to prevent erosion.
- Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities.
- Stormwater from hard stand areas, buildings and substation must be managed using appropriate channels and swales when located within steep areas.
- Erosion control measures such as silt fences (for areas of works) and gravel strips may be considered at the impact zone where water falls from the solar panels onto the soil surface (due to deterioration in natural grassland because of poor maintenance or lack of solar radiation).
- Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any storm water leaving the Solar PV site.
- The existing road infrastructure should be utilised as far as possible to minimise the overall disturbance created by the proposed Solar PV Facility.
- Silt traps should be used where there is a danger of topsoil eroding and entering lower lying wetland resources.
- Construction of gabions and other stabilisation features to prevent erosion, if deemed necessary.
- No stormwater runoff must be allowed to discharge directly into any wetland feature along roads, and flows should thus be allowed to dissipate over a broad area covered by natural vegetation.

CONSTRUCTION PHASE	
Residual impact	With the implementation of appropriate mitigation measures the only residual impact would be a slight increase in water inputs, without an increase in sediments carried into downslope freshwater resource features or the spread of erosion features into downslope freshwater resource features.

CONSTRUCTION PHASE

Potential impact on localised surface water quality.

Alteration or deterioration in the physical, chemical and biological characteristics of water resources (i.e. water quality) such as wetlands & rivers as a result of water/soil pollution. The term 'water quality' must be viewed in terms of the fitness or suitability of water for a specific use (DWAF, 2001). In the context of this impact assessment, water quality refers to its fitness for maintaining the health of aquatic ecosystems. Possible ecological consequences associated with this impact may include:

- Deterioration in freshwater ecosystem integrity; and
- Reduction in and/or loss of species of conservation concern (i.e. rare, threatened/endangered species).

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Low	Negative	Low	Low	High
With Mitigation	Low	Low	Low	Negative	Low	Low	High
Can the impact be reversed?			Highly Reversible with the implementation of appropriate mitigation measures.				
Will impact cause irreplaceable loss or resources?			No irreplaceable loss of freshwater resource features with the implementation of appropriate mitigation measures.				
Can impact be avoided, managed, or mitigated?			The impact can be avoided (see mitigation measures below).				

Mitigation measures to reduce residual risk or enhance opportunities

- No activities may be allowed outside of the development areas, and especially within the identified downstream freshwater resource features and their associated buffer areas as these areas are regarded as no-go areas.
- Implement appropriate measures to ensure strict use and management of all hazardous materials used on site.
- Implement appropriate measures to ensure Strict management of potential sources of pollutants (e.g. litter, hydrocarbons from vehicles and machinery, cement during construction etc.)
- Store hydrocarbons off site where possible, or otherwise implement hydrocarbon storage using impermeable floors with appropriate bunding, sumps and roofing.
- Implement appropriate measures to ensure containment of all contaminated water by means of careful run-off management on the development site.
- Implement appropriate measures to ensure strict control over the behavior of construction workers.
- Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced.

CONSTRUCTION PHASE	
• Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the substations. • Waste should be stored on site in clearly marked containers in a demarcated area. • All waste material should be removed at the end of every working day to designated waste facilities at the main construction camp/suitable waste disposal facility. • All waste must be disposed of offsite. • Ensure vehicles are regularly serviced so that hydrocarbon leaks are limited. • Designate a single location for refueling and maintenance, outside of any freshwater resource features. • Keep a spill kit on site to deal with any hydrocarbon leaks. • Remove soil from the site which has been contaminated by hydrocarbon spillage.	
Residual impact	Residual impacts will be negligible after appropriate mitigation.

CONSTRUCTION							
Loss of freshwater resource features during the construction.							
Direct physical destruction or disturbance of narrow strips of aquatic/wetland habitat by pylon construction and road crossings, being replaced by hard engineered surfaces during construction of the electrical grid infrastructure. This biological impact would however be localised, as a large portion of the remaining catchment and watercourses would remain intact. Possible ecological consequences may include: • Reduction in representation and conservation of freshwater ecosystem/habitat types; • Reduction in the supply of ecosystem goods & services. • Reduction/loss of habitat for aquatic dependent flora & fauna; and • Reduction in and/or loss of species of conservation concern (i.e. rare, threatened/endangered species). As already mentioned, only the gridline and associated service/access route will have a potential direct impact on watercourse habitats. These disturbances will be the greatest during the construction and again in the decommissioning phases as the related disturbances could result in the loss and/or damage to vegetation and alteration of natural geomorphological and hydrological processes within the freshwater resource features. Compacted soils are also not ideal for supporting vegetation growth as they inhibit seed germination.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	High	Medium	Medium	Negative	High	Medium	High
With Mitigation	Low	Medium	Low	Negative	Low	Low	High
Can the impact be reversed?			Partially Reversible. Through a rehabilitation and revegetation program which will be implemented during the decommissioning phase.				

CONSTRUCTION	
Will impact cause irreplaceable loss or resources?	With the implementation of mitigation measures there will not be any irreplaceable loss of freshwater recourses.
Can impact be avoided, managed, or mitigated?	The impact can be largely mitigated and, in some areas, completely avoided (see mitigation measures below).
Mitigation measures to reduce residual risk or enhance opportunities	
• No pylons may be placed within the delineated freshwater resource features as well as their associated buffer areas; however, the pylons may span these features. • Use as far as possible the existing roads. • No activities or movement shall be allowed outside of the approved development footprint. • Any erosion problems observed, to be associated with the relating activity, should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur. • Any disturbed areas should be monitored to ensure that these areas do not become subject to invasive alien plant growth. • No unnecessary vegetation clearance may be allowed. • No vehicles may refuel within watercourses/wetlands/riparian vegetation. • Vegetation clearing should occur in in a phased manner to minimise erosion and/or run-off. • Where no existing wetland road crossings are available the construction of new crossings can be considered. • Where new watercourse/wetland crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (reduce footprint as much as possible). • All crossings over watercourses/wetlands should be such that the flow within the channels is not impeded and should be constructed perpendicular to the river/wetland channel. • The erosion and stormwater management measures included in the stormwater management plan for the EGI must be implemented. • Where new roads need to be constructed, the existing road infrastructure should be rationalised and any unnecessary roads decommissioned and rehabilitated to reduce the disturbance of the area within the watercourses. • During the construction phase, monitor culverts to see if erosion issues arise and if any erosion control is required. • Where possible, culvert bases must be placed as close as possible with natural levels in mind so that these don't form additional steps / barriers. • Vegetation clearing should occur in a phased manner to minimise erosion and/or run-off. • Any areas disturbed during the construction phase should be encouraged to rehabilitate as fast and effective as possible and were deemed necessary by the ECO or Contractor's EO, artificial rehabilitation (e.g. re-seeding with collected or commercial indigenous seed mixes) should be applied to speed up the rehabilitation process in critical areas (e.g. steep slopes and unstable soils). • All alien plant re-growth must be monitored, and should it occur, these plants should be eradicated.	
Residual impact	Residual impacts are unlikely to occur within these freshwater resource habitats, with the implementation of appropriate mitigation measures.

10.2.2 OPERATION PHASE

During the operation phase the facility will operate continuously, mostly unattended and with low maintenance required for the duration of the SEFs life (±20 years). The SEF is likely to be monitored and controlled remotely, with maintenance only taking place when required.

The PV panels, substation, around the pylon locations, along the access routes, as well as within and around other hard surfaces created by the development may lead to increased runoff

(reduction in infiltration) and the potential interception and channeling of surface runoff, particular on surfaces with a steeper gradient. This may potentially lead to:

- A modification to the water input characteristic (input in quantity and a change in water input pattern);
- Increased erosion;
- Sedimentation of the downslope areas; and
- Impairment of wetland functions and services.

Subsequently, a localised long-term impact (more than 20 years) of low intensity (depending on the distance between the PV panels and the freshwater features) could be expected that would have a very low overall significance post-mitigation in terms of its impact on the identified freshwater resource features in the area.

OPERATIONAL PHASE

***Impact on watercourse/wetland systems through the possible increase in surface runoff on watercourse/wetland form and function during the operation and decommissioning phases*.**

This might occur during the operation phase, when hard or compacted surfaces (hard engineered surfaces, roads etc.) increase the volume and velocity of the surface runoff. This could impact the hydrological regime through the increase in flows that are concentrated in certain areas. If flows are too concentrated with high velocities, scour and erosion may occur, with a complete reduction or disturbance of riparian habitat.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Medium	Negative	High	Medium	High
With Mitigation	Low	Medium	Low	Neutral	Medium	Medium	High
Can the impact be reversed?			Highly Reversible with the implementation of appropriate mitigation measures.				
Will impact cause irreplaceable loss or resources?			No irreplaceable loss of freshwater resource features with the implementation of appropriate mitigation measures.				
Can impact be avoided, managed, or mitigated?			The impact can be avoided (see mitigation measures below).				

- Any stormwater within the site must be handled in a suitable manner as per the management measures in stormwater management plan.
- Stormwater from hardstand areas, buildings and the substation must be managed using appropriate channels and swales when located within steep areas.
- No stormwater runoff must be allowed to discharge directly into the watercourses.
- The runoff should rather be dissipated over a broad area covered by natural vegetation or managed using appropriate channels and swales when located within steep embankments.
- Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any stormwater leaving the SEF site.

OPERATIONAL PHASE	
Residual impact	A slight increase in water input (quantity), however, with mitigation measures in place this increase in water input would not impact the general hydrological characteristics of the downslope freshwater resource features.

OPERATIONAL PHASE

Increase in sedimentation and erosion.

For the operation phase, this refers to the alteration in the physical characteristics of freshwater resource features as a result of increased turbidity and sediment deposition, caused by soil erosion, as well as instability and collapse of unstable soils during project operation. Possible ecological consequences associated with this impact may include:

- Deterioration in freshwater ecosystem integrity; and
- Reduction/loss of habitat for aquatic dependent flora & fauna.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	High
With Mitigation	Low	Low	Low	Negative	Low	Low	High
Can the impact be reversed?			Highly Reversible with the implementation of appropriate mitigation measures.				
Will impact cause irreplaceable loss or resources?			No irreplaceable loss of freshwater resource features with the implementation of appropriate mitigation measures.				
Can impact be avoided, managed, or mitigated?			The impact can be avoided (see mitigation measures below).				

- All freshwater resource habitats and their associated buffer areas are regarded as "No-Go" areas apart from the use of service and access roads.
- Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- All bare areas, as a result of the development, should be revegetated with locally occurring species, to bind the soil and limit erosion potential.
- Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities.
- Stormwater from hardstand areas, and the substation must be managed using appropriate channels and swales when located within steep areas.
- Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any storm water leaving the SEF site.

Residual impact	With the implementation of appropriate mitigation measures the only residual impact would be a slight increase in water inputs, without an increase in sediments carried into downslope freshwater resource features or the spread of erosion features into downslope freshwater resource features.

10.2.3 DECOMMISSIONING PHASE

During decommissioning, the potential freshwater impacts will be very similar to that of the Construction Phase, although the potential for water quality and flow related risks will be lower.

DECOMMISSIONING PHASE

Impact on freshwater resource systems through the increase in surface runoff on form and function during decommissioning.

The decommissioning of the proposed PV solar facility will involve high intensity disturbance of a fairly large surface area at and around the site and associated temporary laydown area. As already described the proposed PV Solar facility (apart from the gridline which will span a single watercourse feature) is located outside of any freshwater resource features and subsequently the potential impacts on freshwater resources will potentially be of an indirect nature due to disturbances (removal of vegetation, compaction of soil and a reduction in roughage) within their catchment areas.

Severe cases of erosion may potentially threaten the integrity of local and adjacent ecosystems and impact service provision such as grazing and clean water.

These modifications within the catchment areas may result in the alteration in the quantity, timing, and distribution of water inputs into the downstream freshwater resource features.

Possible ecological consequences associated with this impact may include:

- Deterioration in freshwater ecosystem integrity;
- Reduction/loss of habitat for aquatic dependent flora & fauna; and
- Reduction in the supply of ecosystem goods & services

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Medium	Negative	High	Medium	High
With Mitigation	Low	Medium	Low	Neutral	Medium	Medium	High
Can the impact be reversed?			Partially Reversible. Through a rehabilitation and revegetation program which will be implemented during the decommissioning phase.				
Will impact cause irreplaceable loss or resources?			With the implementation of mitigation measures there will not be any irreplaceable loss of freshwater recourses.				
Can impact be avoided, managed or mitigated?			The impact can be largely mitigated and, in some areas, completely avoided (see mitigation measures below).				

Mitigation measure to reduce residual risk or enhance opportunities:

- All freshwater resource habitats and their associated buffer areas are regarded as "No-Go" areas apart from the decommissioning of the grid line.
- Infrastructure footprints and associated areas of disturbance should be minimised as far as practically possible.
- All bare areas, affected by the development, should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.
- Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities
- No stormwater runoff must be allowed to discharge directly into any water course from the decommissioning site and flows from these areas should be allowed to dissipate over a broad area covered by natural vegetation.

DECOMMISSIONING PHASE	
Residual impact	If the above recommended mitigation measures are strictly implemented, the residual impact will be very low.

DECOMMISSIONING PHASE

***Increase in sedimentation and erosion*.**

Alteration in the physical characteristics of freshwater resource features as a result of increased turbidity and sediment deposition.

Possible ecological consequences associated with this impact may include:

- Deterioration in freshwater ecosystem integrity; and
- Reduction/loss of habitat for aquatic dependent flora & fauna.

This may furthermore, influence water quality downstream.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	High
With Mitigation	Low	Low	Low	Negative	Low	Low	High
Can the impact be reversed?			Largely reversible, with the implementation of appropriate mitigation measures.				
Will impact cause irreplaceable loss or resources?			No irreplaceable loss of freshwater resource features with the implementation of appropriate mitigation measures.				
Can impact be avoided, managed or mitigated?			The impact can be avoided (see mitigation measures below).				

Mitigation measures to reduce residual risk or enhance opportunities

- All freshwater resource habitats and their associated buffer areas are regarded as "No-Go" areas, apart from the decommission of the electrical grid line.
- Any erosion problems observed should be rectified immediately and monitored thereafter to ensure that they do not re-occur.
- There should be regular monitoring for erosion for at least 2 years after decommissioning by the applicant to ensure that no erosion problems develop as a result of the disturbance, and if they do, to immediately implement erosion control measures.
- All bare areas, affected by the development, should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.
- There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased.

Residual impact	If the above recommended mitigation measures are strictly implemented, the residual impacts will be avoided.

DECOMMISSIONING PHASE

Potential impact on localised surface water quality.

Alteration or deterioration in the physical, chemical and biological characteristics of water resources (i.e. water quality) such as wetlands & rivers as a result of water/soil pollution. The term 'water quality' must be viewed in terms of the fitness or suitability of water for a specific use (DWAF, 2001). In the context of this impact assessment, water quality refers to its fitness for maintaining the health of aquatic ecosystems. Possible ecological consequences associated with this impact may include:

- Deterioration in freshwater ecosystem integrity; and
- Reduction in and/or loss of species of conservation concern (i.e. rare, threatened/endangered species).

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Low	Negative	Low	Low	High
With Mitigation	Low	Low	Medium	Negative	Low	Low	High
Can the impact be reversed?			Highly Reversible with the implementation of appropriate mitigation measures.				
Will impact cause irreplaceable loss or resources?			No irreplaceable loss of freshwater resource features with the implementation of appropriate mitigation measures.				
Can impact be avoided, managed, or mitigated?			The impact can be avoided (see mitigation measures below).				

Mitigation measures to reduce residual risk or enhance opportunities

- No activities may be allowed outside of the development areas, and especially within the identified downstream freshwater resource features and their associated buffer areas as these areas are regarded as no-go areas.
- Implement appropriate measures to ensure strict use and management of all hazardous materials used on site.
- Implement appropriate measures to ensure Strict management of potential sources of pollutants (e.g. litter, hydrocarbons from vehicles and machinery, cement during construction etc.)
- Store hydrocarbons off site where possible, or otherwise implement hydrocarbon storage using impermeable floors with appropriate bunding, sumps and roofing.
- Implement appropriate measures to ensure containment of all contaminated water by means of careful run-off management on the development site.
- Implement appropriate measures to ensure strict control over the behavior of construction workers.
- Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced.
- Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the substations.
- Waste should be stored on site in clearly marked containers in a demarcated area.
- All waste material should be removed at the end of every working day to designated waste facilities at the main construction camp/suitable waste disposal facility.
- All waste must be disposed of offsite.
- Ensure vehicles are regularly serviced so that hydrocarbon leaks are limited.
- Designate a single location for refueling and maintenance, outside of any freshwater resource features.
- Keep a spill kit on site to deal with any hydrocarbon leaks.
- Remove soil from the site which has been contaminated by hydrocarbon spillage.

DECOMMISSIONING PHASE	
Residual impact	Residual impacts will be negligible after appropriate mitigation.

10.3 TERRESTRIAL BIODIVERSITY (FLORA AND FAUNA)

Potential ecological impacts resulting from the proposed development would stem from a variety of different activities and risk factors associated with the construction and operation phases of the project.

10.3.1 CONSTRUCTION PHASE

SEFs require an initial high intensity disturbance of a large surface area including the clearance of the vegetation cover and the levelling of earth on different terraces where necessary and the compaction of local soil within the development footprint. Concrete foundations for the framework on which the PV panels will be mounted. Soil disturbance, vegetation clearance and hardened surfaces will also be associated with the construction of access and internal roads within the PV solar facility. The internal substation would also need to be constructed within the site. Temporary laydown and storage areas would need to be placed within the site for the construction works.

CONSTRUCTION PHASE

Potential impacts on plant biodiversity and habitats

Vegetation clearing for site preparation will impact local vegetation habitats

Impacts on vegetation and protected plant species would occur due to the construction of the facility and associated infrastructure. This impact is regarded as the most likely and significant impact and will lead to direct loss of vegetation, including protected species.

The most likely consequences include:

- local loss of habitat (to an extent as a natural ground covering will be maintained where possible);
- very small and local disturbance to processes maintaining local biodiversity and ecosystem goods and services; and
- a potential loss of a few local protected species.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Low	High	Negative	High	Medium	High
With Mitigation	Medium	Low	Medium	Negative	Medium	Medium	High
Can the impact be reversed?			Partially Reversible. Through a rehabilitation and revegetation program which will be implemented during the decommissioning phase.				

CONSTRUCTION PHASE	
Will impact cause irreplaceable loss or resources?	Only marginal loss of resources.
Can impact be avoided, managed or mitigated?	The impact cannot be avoided, however the impact can be managed and mitigated (see mitigation measures below).

Mitigation measures to reduce residual risk or enhance opportunities:

- Preconstruction walk-through of the final development footprint for protected species and species of conservation concern that would be affected.
- Before construction commences individuals of listed species within the development footprint that would be affected, should be counted and marked by the ecologist conducting the pre-construction walk-through survey. Permits from the relevant provincial authorities, will be required to relocate and/or disturb listed plant species.
- Pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas etc.
- Demarcate all areas to be cleared with construction tape or similar material where practical. However, caution should be exercised to avoid using material that might entangle fauna.
- ECO and/or Contractor's EO to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of the project, when the majority of vegetation clearing is taking place.
- Ensure that laydown areas, construction camps and other temporary use areas are located in areas of low sensitivity and are properly fenced or demarcated as appropriate and practically possible.
- All vehicles to remain on demarcated roads and no unnecessary driving in the veld outside these areas should be allowed.
- Regular dust suppression during construction, if deemed necessary, especially along access roads.
- No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purpose without express permission from the ECO and or Contractor's EO in consultation with the Botanical Specialist.
- No fires should be allowed on-site.

Residual impact	Vegetation loss within areas where hard engineering surfaces will be constructed will take a very long time, post-decommissioning to restore and as such is regarded as a residual impact.

CONSTRUCTION PHASE

Impact on Faunal Diversity.

Increased levels of noise, pollution, disturbance, and human presence during construction will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some impact on fauna is highly likely to occur during construction.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Low	Low	Medium	Negative	High	Medium	High

CONSTRUCTION PHASE							
With Mitigation	Low	Low	Medium	Negative	Medium	Medium	High

Can the impact be reversed?	Partially Reversible. Only a few highly adaptable and opportunistic faunal species may return following the construction phase. It is however unlikely that these animals will permanently reside within the project site, but may potentially move through the area to forage areas. However, the rehabilitation of a stable vegetation cover after the decommissioning of the facility may allow some animals to return to the area, with the area providing suitable habitat for some species.
Will impact cause irreplaceable loss or resources?	Only marginal loss of resources. Faunal diversity was very low and most species will merely move away during the construction phase.
Can impact be avoided, managed or mitigated?	The impact cannot be avoided, however the impact can be managed and mitigated (see mitigation measures below).

Mitigation measures to reduce residual risk or enhance opportunities:

- Site access should be controlled and no unauthorised persons should be allowed onto the site.
- Any fauna directly threatened by the associated activities should be removed to a safe location by a suitably qualified person.
- The collection, hunting, or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated site.
- Fires should not be allowed on site.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel, and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- All construction vehicles should adhere to a low-speed limit (30 km/h) to avoid collisions with susceptible species such as snakes and tortoises.
- Construction vehicles limited to a minimal footprint on site (no movement outside of the earmarked footprint).

Residual impact	The altered development area will contain a lower diversity of habitat types and niches for faunal species, however faunal diversity was in any way confirmed to be limited and as such this potential residual impact can be **regarded as low**.

CONSTRUCTION PHASE

Potential impacts on Animal Species of Conservation Concern (SCC)

The foremost concern revolves around habitat destruction, as this development will likely lead to the loss of habitats utilized these potential animal SCC for foraging and movement. These species may traverse this area in search of food, making the disruption of their migratory paths and foraging grounds a potential pressing issue.

Moreover, the displacement of these species due to the solar development can disrupt their natural behaviours, potentially leading to increased stress, reduced breeding success, and a heightened risk of predation or competition. This displacement also threatens their food sources, which may result in population declines and a loss of biodiversity in the region.

Another distressing implication is the heightened risk of illegal poaching that could accompany such a development. The disturbance caused by construction and human presence in these areas may attract

CONSTRUCTION PHASE

poachers, targeting these vulnerable and valuable species for trade, further endangering their populations.

During the survey no animal SCC was recorded within the project site and even though there are some suitable habitat within the Project Site the potential for such animal SCC to inhabit the area is regarded as low

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	High	Low	High	Negative	Low	Medium	High
With Mitigation	High	Low	Medium	Negative	Low	Low	High
Can the impact be reversed?			Partially Reversible. Most species including SCC will move away during the construction phase. It is unlikely that these animals will return to the project site during the operational phase, but may potentially move through the area to forage areas. The rehabilitation of a stable vegetation cover after the decommissioning of the facility may some suitable habitat for animal SoCC				
Will impact cause irreplaceable loss or resources?			Only marginal loss of resources. No Faunal SCC was observed within the project site and the project site provide minimal suitable habitat for Faunal SCC.				
Can impact be avoided, managed or mitigated?			The impact can be avoided.				

Mitigation measures to reduce residual risk or enhance opportunities:

- Pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness regarding potential animal SCC, and the appropriate procedures to be followed if such a species has been observed during the construction phase.
- Should any faunal SCC be encountered, construction should be halted, the EO must be notified, and authorisation to relocate such species must be obtained from DFFE and/or North West Department.
- No staff member may attempt to handle these species.
- Strict control must be maintained over all activities during construction, in line with an approved construction EMPr.
- Contractors and working staff should stay within the development area and movement outside these areas must be restricted.
- No development should occur beyond the proposed footprint.
- No hunting/trapping or collecting of faunal species is allowed.
- No informal fires by construction personnel are allowed.
- Faunal habitat beyond the demarcated area should not be altered.
- Driving must take place on existing and new access roads and a speed limit of 30km/h must be implemented on all roads traversing the project site during the construction phase.
- Passage ways, of the appropriate size, should be created along the boundary fence of the PV facility, to allow the potential "target" animals to safely move through the PV facility.
- The use of electrical fencing is strongly discouraged.
- If electrical fencing is going to be used, no electrical wires may be placed within a minimum of 1 m from the ground level.

Residual impact	Due to the nature of this development, there will be a permanent loss of habitat and forage for potential fauna SoCC. However, due to the fact that only a small

CONSTRUCTION PHASE	
	area of potential suitable habitat was found within the footprint and no fauna SCC was observed during the surveys, this potential residual impact can be regarded as very low.

CONSTRUCTION AND OPERATIONAL PHASE

Soil erosion and associated degradation of ecosystems.

During and following construction, there will be a lot of disturbed and loose soil at the site which will render the area vulnerable to erosion. Erosion is one of the greater risk factors associated with the development and it is therefore critically important that proper erosion control structures are built and maintained over the lifespan of the project.

Severe cases of erosion may potentially threaten the integrity of local and adjacent ecosystems and impact service provision such as grazing and clean water.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
With Mitigation	Low	Low	Low	Negative	Medium	Medium	High
Can the impact be reversed?			Yes. By implementing robust erosion monitoring and management measures, along with diligent execution of the plan, swift identification of erosion features can occur, enabling effective remediation of affected areas and reversal of associated impacts.				
Will impact cause irreplaceable loss or resources?			Effective implementation of erosion control, monitoring, and management measures can successfully prevent the irreparable loss of resources caused by erosion.				
Can impact be avoided, managed or mitigated?			Impact can be largely avoided and where they occur can be successfully managed/mitigated.				

Mitigation measures to reduce residual risk or enhance opportunities:

- Any erosion problems observed along access roads or any hardened/engineered surface should be rectified immediately and monitored thereafter to ensure that they do not re-occur.
- All bare areas (excluding agricultural land and the development footprint), affected by the development, should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.
- Re-instate as much of the eroded area to its pre-disturbed, "natural" geometry (no change in elevation and any banks not to be steepened) where possible.
- Site rehabilitation should aim to restore surface drainage patterns as far as is feasible.
- An erosion control management plan should be utilised to prevent erosion
- Roads and other disturbed areas should be regularly monitored for erosion problems, and problem areas should receive follow-up monitoring by the EO to assess the success of the remediation.
- Topsoil must be removed and stored separately from subsoil. Topsoil must be reapplied where appropriate as soon as possible to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.

CONSTRUCTION AND OPERATIONAL PHASE	
• Erosion control measures such as silt fences (for areas of works) and gravel strips may be considered at the impact zone where water falls from the solar panels onto the soil surface (due to deterioration in natural grassland because of poor maintenance or lack of solar radiation). • Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities • Stormwater from hardstand areas, buildings and the substation must be managed using appropriate channels and swales when located within steep areas. • Storm water run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any storm water leaving the Solar PV site.	
Residual impact	The loss of fertile soil and soil capping resulting in areas which cannot fully rehabilitate itself with a good vegetation cover. With appropriate avoidance and mitigation residual impacts will be very low.

10.3.2 OPERATION PHASE

During the operation phase the facilities will operate continuously, mostly unattended and with low maintenance required for the duration of the SEFs lives (±20 years). The SEFs is likely to be monitored and controlled remotely, with maintenance only taking place when required.

The PV panels as well as the hard surfaces created by the development may lead to increased runoff (reduction in infiltration) and the potential interception and channeling of surface runoff, particular on surfaces with a steeper gradient. This may potentially lead to:

- A modification to the surface runoff and infiltration patterns;
- Increased erosion; and
- Sedimentation of the downslope areas.

Subsequently, a localised long-term impact (more than 20 years) of moderate to low intensity could be expected that would have a very low overall significance post-mitigation in terms of its impact on the identified freshwater resource features in the area.

OPERATIONAL PHASE

Alien Plant Invasion

Increased alien plant invasion is one of the greatest risk factors associated with this development following the construction phase. The disturbed and bare ground that is likely to be present at the site during and after construction would leave the site vulnerable to alien plant invasion for some time if not managed. Furthermore, the National Environmental Management Biodiversity Act (Act No. 10 of 2004), as well as the Conservation of Agricultural Resources Act, (Act No. 43 of 1983) requires that listed alien species are controlled in accordance with the Act.

Severe cases of Alien Plant Invasion may potentially threaten the integrity of local and adjacent ecosystems and impact service provision such as forage.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence

OPERATIONAL PHASE							
Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
With Mitigation	Low	Low	Low	Negative	Medium	Medium	High

Can the impact be reversed?	Yes. By implementing robust Alien Invasive Plant (AIP) monitoring and management measures, along with diligent execution of the plan, swift identification of areas that contain signs of alien plant invasion, enabling effective remediation of affected areas and reversal of associated impacts.
Will impact cause irreplaceable loss or resources?	Effective implementation of AIP control, monitoring, and management measures can successfully prevent the irreparable loss of resources caused by Alien Plant Invasion.
Can impact be avoided, managed or mitigated?	Impact can be largely avoided and where they occur can be successfully managed/mitigated.

Mitigation measures to reduce residual risk or enhance opportunities:

- The successful reduction in the threat (significance) posed by Alien Invasive Plants relies on a detailed;
    - Site-specific eradication and management programme for alien invasive plants;
    - Site-specific Vegetation Rehabilitation Management Plan; and
    - The meticulous implementation of this Management Plan.
- Such an Alien Invasive and Vegetation Rehabilitation Management Plan must subsequently be included in the Environmental Management Programme (EMPr).
- Regular monitoring by the operation and maintenance team for alien plants must occur and could be conducted simultaneously with erosion monitoring.
- When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur and increase to problematic levels.
- Clearing methods must aim to keep disturbance to a minimum.
- No planting or importing any listed invasive alien plant species (all Category 1a, 1b, 2, and 3 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.

Residual impact	If the above recommended mitigation measures are strictly implemented, and some re-establishment and rehabilitation of natural vegetation is allowed, the residual impact will be very low.

10.3.3 DECOMMISSIONING PHASE

During decommissioning, the potential impacts will be very similar to that of the Construction Phase, although with slightly lower significance.

Decommissioning Phase
Alien Plant Invasion
Increased alien plant invasion is one of the greatest risk factors associated with this development following the decommission phase. The disturbed and bare ground that is likely to be present at the site during and after decommissioning would leave the site vulnerable to alien plant invasion for some time if not managed. Furthermore, the National Environmental Management Biodiversity Act (Act No. 10 of

Decommissioning Phase

2004), as well as the Conservation of Agricultural Resources Act, (Act No. 43 of 1983) requires that listed alien species are controlled in accordance with the Act.

Severe cases of Alien Plant Invasion may potentially threaten the integrity of local and adjacent ecosystems and impact service provision such as forage.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
With Mitigation	Low	Low	Low	Negative	Low	Low	High
Can the impact be reversed?			Yes. By implementing an effective rehabilitation and re-vegetation plan, as well as a robust erosion monitoring and management plan.				
Will impact cause irreplaceable loss or resources?			Effective implementation of a rehabilitation and re-seeding plan as well as a robust Alien Invasive Plant (AIP) monitoring and management plan, irreparable loss of resources caused by Alien Plant Invasion can successfully be avoided.				
Can impact be avoided, managed or mitigated?			Impact can be largely avoided and where they occur can be successfully managed/mitigated.				

- The successful reduction in the threat (significance) posed by Alien Invasive Plants relies on a detailed;
  - Site-specific eradication and management programme for alien invasive plants;
  - Site-specific Vegetation Rehabilitation Management Plan; and
  - The meticulous implementation of this Management Plan.
- Such an Alien Invasive and Vegetation Rehabilitation Management Plans must subsequently be included in the Environmental Management Programme (EMPr).
- Due to the disturbance at the site alien plant species are likely to be a long-term problem at the site following decommissioning and regular control must be implemented until a cover of indigenous species (ideally climax species) has returned.
- When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur and increase to problematic levels.
- Clearing methods must aim to keep disturbance to a minimum.
- No planting or importing of any listed invasive alien plant species (all Category 1a, 1b, 2, and 3 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.

Residual impact	If the above recommended mitigation measures are strictly implemented, the residual impacts will be **avoided**.

Decommissioning Phase

Soil erosion and associated degradation of ecosystems.

During and following decommission, there will be a lot of disturbed and loose soil at the site which will render the area vulnerable to erosion. Erosion is one of the greater risk factors associated with the

Decommissioning Phase

development and it is therefore critically important that proper erosion control structures are built and maintained over the lifespan of the project.

Severe cases of erosion may potentially threaten the integrity of local and adjacent ecosystems and impact service provision such as grazing and clean water.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
With Mitigation	Low	Low	Low	Negative	Low	Low	High
Can the impact be reversed?			Yes. By implementing a rehabilitation and re-vegetation plan, as well as a robust erosion monitoring and management plan.				
Will impact cause irreplaceable loss or resources?			Effective implementation of a rehabilitation and re-seeding plan as well as an erosion control, monitoring, and management plan, irreparable loss of resources caused by erosion can successfully be avoided.				
Can impact be avoided, managed or mitigated?			Impact can be largely avoided and where they occur can be successfully managed/mitigated.				

Mitigation measures to reduce residual risk or enhance opportunities:

- Any erosion problems observed should be rectified immediately and monitored thereafter to ensure that they do not re-occur.
- There should be regular monitoring for erosion for at least 2 years after decommissioning by the applicant to ensure that no erosion problems develop as a result of the disturbance, and if they do, to immediately implement erosion control measures.
- All bare areas, affected by the development, should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.
- Re-instate as much of the eroded area to its pre-disturbed, "natural" geometry (no change in elevation and any banks not to be steepened) where possible.

Residual impact	If the above recommended mitigation measures are strictly implemented, the residual impact will be very low.

Decommissioning Phase

Direct Faunal Impacts.

Increased levels of noise, pollution, disturbance, and human presence during decommissioning will be detrimental to fauna. Sensitive and shy fauna would move away from the area during this phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some impact on fauna is highly likely to occur during construction.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence

Decommissioning Phase							
Without Mitigation	Low	Low	Medium	Negative	Medium	Medium	High
With Mitigation	Low	Low	Low	Negative	Low	Low	High

Can the impact be reversed?	Yes. Only a few highly adaptable and opportunistic faunal species may inhabit the project site during the operational phase. These species will move away during the decommissioning phase with some species returning post-decommissioning phase. However, the rehabilitation of a stable vegetation cover after the decommissioning of the facility may not only allow some of these species that have inhabited the project site during the operational phase to return but may allow faunal species that have inhabited the area post construction phase to return.
Will impact cause irreplaceable loss or resources?	Implementing an effective rehabilitation and re-vegetation plan can prevent any irretrievable loss of resources.
Can impact be avoided, managed or mitigated?	Disturbance of residing faunal species during the decommissioning phase cannot be avoided, however the impact can be managed and mitigated (see mitigation measures below).

Mitigation measures to reduce residual risk or enhance opportunities:

- Site access should be controlled and no unauthorised persons should be allowed onto the site.
- Any fauna directly threatened by the associated activities should be removed to a safe location by a suitably qualified person.
- The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated site.
- Fires should not be allowed on site.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel, and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- All vehicles should adhere to a low-speed limit (30km/h) to avoid collisions with susceptible species such as snakes and tortoises.
- Vehicles limited to a minimal footprint on site (no movement outside of the earmarked footprint).

Residual impact	The development site will be rehabilitated and re-vegetated establishing faunal habitat and forage. Thus, there will be no residual impact.

10.4 AVIFAUNA

In consideration that there are anthropogenic activities and influences within the landscape, there are two negative impacts to biodiversity, including avifauna. These include:

- Fences; and
- Powerlines.

The proposed activities will be conducted over the several habitats. These areas encompass indigenous vegetation that may be considered largely functional in nature and as such any irresponsible and/or medium to high impact activities will likely result in the loss of the following resources:

- CBA 1;
- ESA 1 and 2 and

- LC ecosystem.

The assessment of impact significance considers pre-mitigation as well as implemented of post-mitigation scenarios. Although different species and groups will react differently to the development, the risk assessment was undertaken bearing in mind the potential impacts to the important species that may be found within the PAOI.

10.4.1 CONSTRUCTION PHASE

The following potential main impacts on the biodiversity were considered for the construction phase of the proposed development. This phase refers to the period during construction when the proposed features are constructed; and is considered to have the largest direct impact on biodiversity. The following potential impacts to terrestrial biodiversity were considered:

- Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community, foraging and potential breeding habitats for SCC;
- Introduction of alien species, especially plants, altering natural vegetation for avifauna;
- Displacement of the indigenous avifauna communities (including SCC) due to habitat loss, direct mortalities, and disturbance (road collisions, noise, dust, light, vibration, and poaching); and
- Direct mortality from persecution or poaching of avifauna species and collection of eggs.

All likely impacts are rated as Medium-High negative significance pre-mitigation but may be reduced to Low-Medium significance through the proper implementation of effective mitigation measures. The most important mitigation measures for this phase are as follows:

- Ensure that the site footprint is as small as possible and responsibly positioned, the development area must be properly fenced off during construction;
- Land clearing must be done over at least three days and conducted linearly and successively from the south to the north; and
- No trapping, killing, or poisoning of any wildlife is to be allowed and signs must be put up to enforce this. Monitoring must take place in this regard.

Impact Phase: Construction

Potential impact description: Destruction, further loss and fragmentation of the habitats, ecosystems and vegetation community, including protected species.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Medium	Negative	Medium	High	Medium
With Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
Can the impact be reversed?			Yes, but only partially as vegetation will still be lost				
Will impact cause irreplaceable loss or resources?			Yes, but habitat will still be lost				
Can impact be avoided, managed or mitigated?			Yes, but only partially. Vegetation will still be lost				

Impact Phase: Construction
Mitigation measures to reduce residual risk or enhance opportunities: • The areas to be developed must be specifically demarcated to prevent movement into surrounding environments. • Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, must under no circumstances be fragmented or disturbed further. • If possible solar panels must be mounted on pile driven or screw foundations, such as post support spikes, rather than heavy foundations, such as trench-fill or mass concrete foundations, to reduce the negative effects on natural soil functioning, such as its filtering and buffering characteristics, while maintaining habitats for both below and above-ground biodiversity. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion. This will also reduce the likelihood of encroachment by alien invasive plant species. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are indigenous to this vegetation type. • A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment. • Cement must be mixed in a designated area on a liner away from water sources and buffers and that successful rehabilitation of the construction areas can take place • Leaking equipment and vehicles must be repaired immediately or be removed from PAOI to facilitate repair. • A fire management plan needs to be complied to restrict the impact of fire. • Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site. A location specific waste management plan must be put in place to limit the presence of rodents and pests and waste must not be allowed to enter surrounding areas. • A pest control plan must be put in place and implemented; it is imperative that poisons not be used to control pests due to the likely occasional presence of SCC. • Litter, spills, fuels, chemical and human waste in and around the project area must be minimised and controlled according to the waste management plan. • A minimum of one toilet must be provided per 10 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area. • The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility within every 10 days at least. • Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regards to waste management. Under no circumstances may domestic waste be burned on site or buried on open pits. • Discussions are required on sensitive environmental receptors within the PAOI to inform contractors and site staff of the presence of protected species and sensitive habitat, their identification, conservation status and importance, biology, habitat requirements and management requirements in line with the Environmental Authorisation and within the EMPr. • Refuse bins will be responsibly emptied and secured. Temporary storage of domestic waste shall be in covered and secured waste skips. Maximum domestic waste storage period will be 10 days.

Residual impact	Yes, but acceptable negative impact

Impact Phase: Construction
Potential impact description: Spread and/or establishment of alien and/or invasive species.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**

Impact Phase: Construction							
Without Mitigation	Medium	Medium	Medium	Negative	Medium	High	Medium
With Mitigation	Low	Medium	Medium	Negative	Medium	Medium	Medium
Can the impact be reversed?	Yes, alien invasive management plan can control it						
Will impact cause irreplaceable loss or resources?	No, should the alien management plan be implemented						
Can impact be avoided, managed or mitigated?	Yes, should the alien management plan be implemented						
Mitigation measures to reduce residual risk or enhance opportunities: • An Invasive Alien Plant Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changes in IAP composition. • The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprints of the roads must be kept to prescribed widths. • Only existing access routes and walking paths may be made use of.							
Residual impact	*Yes, but acceptable negative impact*						

Impact Phase: Construction							
Potential impact description: Displacement of avifaunal community due to habitat loss, direct mortalities and disturbance (road and powerline collisions, noise, dust, vibration, fencing and poaching).							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Medium	Negative	Medium	High	Medium
With Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
Can the impact be reversed?	Yes, but only partially as avifauna will still be disturbed and displaced. Territories will also be disrupted						
Will impact cause irreplaceable loss or resources?	Yes, but avifauna will still be disturbed and displaced.						
Can impact be avoided, managed or mitigated?	Yes, but avifauna will still be disturbed and displaced.						
Mitigation measures to reduce residual risk or enhance opportunities: • The areas to be developed must be specifically demarcated to prevent movement into surrounding environments. • All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species, and owls, which are often persecuted out of superstition. Signs must be put up to enforce this. • The duration of the construction must be kept to a minimum to avoid disturbing avifauna. • Outside lighting must be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting							

Impact Phase: Construction

should be avoided, and sodium vapor (red/green) lights should be used wherever possible. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40 km/h), to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited.

- All project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region.
- All areas to be developed must be walked through prior to any activity to ensure no SCC nests or avifauna species are found in the area. Should any Species of Conservation Concern be found and not move out of the area, or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.
- Infrastructure must be consolidated where possible to minimise the amount of ground and air space used.
- Fencing mitigations:
    - Top 2 strands must be smooth wire;
    - Routinely retention loose wires;
    - Minimum 300 mm between wires; and
    - Place markers on fences.
- If feasible the internal medium voltage powerlines should be thoroughly insulated and preferably buried.
- Any exposed parts must be covered (insulated) to reduce electrocution risk
- The BESS must be enclosed in a structure with a non-reflective surface.
- Post-construction monitoring should follow the BirdLife South Africa best practice guidelines for solar energy facilities (BirdLife South Africa, 2017). If monitoring results indicate excessive bird fatalities, then adaptive mitigations should be implemented. Before implementation, these should be discussed with the avifaunal specialist and ECO and could include the retrofitting/incorporation of additional visual cues/diverters to existing PV panels/infrastructure.
- Overhead cables/lines must be fitted with bird diverters or flappers.
- All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution.
- Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes the wetting of exposed soft soil surfaces.
- No non-environmentally friendly suppressants may be used as this could result in the pollution of water sources.
- Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed signs must be erected to enforce slow speeds.
- A stormwater management plan must be compiled and implemented.

Residual impact	*Yes, but acceptable negative impact*

Impact Phase: Construction

Potential impact description: Dust generation from construction activities.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Low	Medium	Medium	Negative	Low	Low	Medium
With Mitigation	Low	Low	Low	Negative	Low	Low	Low
Can the impact be reversed?			Yes, dust can be reduced				
Will impact cause irreplaceable loss or resources?			No				

Impact Phase: Construction	
Can impact be avoided, managed or mitigated?	Yes, with appropriate mitigations, dust can be reduced

Mitigation measures to reduce residual risk or enhance opportunities:

- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events etc.
- Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed signs must be erected to enforce slow speeds.
- Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes the wetting of exposed soft soil surfaces.
- No non-environmentally friendly suppressants may be used as this could result in the pollution of water sources.

Residual impact	Yes, but acceptable negative impact

10.4.2 OPERATION PHASE

The operational phase of the impact of daily activities is anticipated to spread further the IAP, as well as the deterioration of the habitats due to the increase of dust and edge effect impacts. Moving maintenance vehicles do not only cause sensory disturbances to avifauna, affecting their life cycles and movement, but will lead to direct mortalities due to collisions.

The following potential impacts were considered:

- Continued fragmentation and degradation of natural habitats and ecosystems;
- Continuing spread of IAP and weed species;
- Ongoing displacement and direct mortalities of the avifauna communities (including SCC) due to continued disturbance (road collisions, noise, light, dust, vibration, poaching, etc.); and
- Heat Radiation from the BESS and Solar Panels.

All potential impacts may be reduced from a significance rating of High to Low with the proper implementation of ongoing mitigation measures. The most important mitigation measures to implement during this phase include:

- The continual usage of the same roadways, parking areas and walkways, and the following of speed limits;
- The responsible management of all waste;
- An IAP management and habitat rehabilitation plan must be implemented and updated annually by specialist;
- Ongoing post-construction monitoring should be conducted to determine the impact of PV facilities as required by the Jenkins et al. (2017).

Impact Phase: Operational
Potential impact description: Continued fragmentation and degradation of habitats and ecosystems

Operation of PV Facility

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**

Impact Phase: Operational							
Without Mitigation	Medium	Medium	Medium	Negative	Medium	High	Medium
With Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
Can the impact be reversed?	Yes, but only partially as vegetation will still be lost						
Will impact cause irreplaceable loss or resources?	Yes, but habitat will still be lost						
Can impact be avoided, managed or mitigated?	Yes, but only partially. Vegetation will still be lost						

Mitigation measures to reduce residual risk or enhance opportunities:

- A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.
- Cement must be mixed in a designated area on a liner away from water sources and buffers and that successful rehabilitation of the construction areas can take place
- Leaking equipment and vehicles must be repaired immediately or be removed from PAOI to facilitate repair.
- A fire management plan needs to be complied to restrict the impact of fire.
- Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site. A location specific waste management plan must be put in place to limit the presence of rodents and pests and waste must not be allowed to enter surrounding areas.
- A pest control plan must be put in place and implemented; it is imperative that poisons not be used to control pests due to the likely occasional presence of SCC.
- Litter, spills, fuels, chemical and human waste in and around the project area must be minimised and controlled according to the waste management plan.
- A minimum of one toilet must be provided per 10 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area.
- The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility within every 10 days at least.
- Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regards to waste management. Under no circumstances may domestic waste be burned on site or buried on open pits.
- Discussions are required on sensitive environmental receptors within the PAOI to inform contractors and site staff of the presence of protected species and sensitive habitat, their identification, conservation status and importance, biology, habitat requirements and management requirements in line with the Environmental Authorisation and within the EMPr.
- Refuse bins will be responsibly emptied and secured. Temporary storage of domestic waste shall be in covered and secured waste skips. Maximum domestic waste storage period will be 10 days.

Residual impact	Yes, but acceptable negative impact

Impact Phase: Operational
Potential impact description: Spread of alien and/or invasive species

Impact Phase: Operational

Operation of PV Facility

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
With Mitigation	Low	Low	Low	Negative	Low	Low	Low
Can the impact be reversed?			Yes, alien invasive management plan can control it				
Will impact cause irreplaceable loss or resources?			No, should the alien management plan be implemented				
Can impact be avoided, managed or mitigated?			Yes, should the alien management plan be implemented				

Mitigation measures to reduce residual risk or enhance opportunities:

- An Invasive Alien Plant Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changes in IAP composition.
- The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprints of the roads must be kept to prescribed widths.

Only existing access routes and walking paths may be made use of.

Residual impact	Yes, but acceptable negative impact

Impact Phase: Operational

Potential impact description: Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road and powerline collisions, noise, light, dust, vibration)

Operation of PV Facility

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	High	Medium	Medium	Negative	Medium	Medium	Medium
With Mitigation	Medium	Low	Low	Negative	Low	Low	Low
Can the impact be reversed?			Yes, but only partially as avifauna will still be disturbed and displaced. Territories will also be disrupted				
Will impact cause irreplaceable loss or resources?			Yes, but avifauna will still be disturbed and displaced.				
Can impact be avoided, managed or mitigated?			Yes, but avifauna will still be disturbed and displaced.				

Impact Phase: Operational

Mitigation measures to reduce residual risk or enhance opportunities:

- All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species, and owls, which are often persecuted out of superstition. Signs must be put up to enforce this.
- Outside lighting must be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (red/green) lights should be used wherever possible.
- All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40 km/h), to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited.
- Fencing mitigations:
  - Top 2 strands must be smooth wire;
  - Routinely retention loose wires;
  - Minimum 300 mm between wires; and
  - Place markers on fences.
- Any exposed parts must be covered (insulated) to reduce electrocution risk
- Post-construction monitoring should follow the BirdLife South Africa best practice guidelines for solar energy facilities (BirdLife South Africa, 2017). If monitoring results indicate excessive bird fatalities, then adaptive mitigations should be implemented. Before implementation, these should be discussed with the avifaunal specialist and ECO and could include the retrofitting/incorporation of additional visual cues/diverters to existing PV panels/infrastructure.
- Overhead cables/lines must be fitted with bird diverters or flappers, this must be maintained for the extent of the project.
- All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution
- No non-environmentally friendly suppressants may be used as this could result in the pollution of water sources.
- Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed signs must be erected to enforce slow speeds.
- A stormwater management plan must be compiled and implemented.

Residual impact	*Yes, but acceptable negative impact*

10.5 HERITAGE, ARCHAEOLOGY AND PALEONTOLOGY

As no heritage features were located, the impact significance during the construction phase is rated as low before and after mitigation.

A Medium impact significance has been allocated for the construction phase of the solar 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.

The impact analysis of the project has shown no potential archaeological and/or other cultural heritage features identified during the fieldwork.

Impact Phase: Construction/ Operation/Decommissioning

Potential impact description: Damage or destruction to archaeological heritage.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Low	Low	Low	Neutral	Low	Low	High

Impact Phase: Construction/ Operation/Decommissioning							
With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Can the impact be reversed?			No. Destruction to heritage sites is permeant.				
Will impact cause irreplaceable loss or resources?			Yes. Heritage sites are unique and irreplicable.				
Can impact be avoided, managed or mitigated?			Yes. Follow mitigation measures as described by SAHRA				

Mitigation measures to reduce residual risk or enhance opportunities:

- Chance find protocol must be implemented

Residual impact	Yes, but acceptable as of low negative significance

Impact Phase: Construction/ Operation/Decommissioning

Potential impact description: Impact on Fossil Heritage

Detailed description of impact:
The excavations and clearing of vegetation during the construction phase of the PV Facility and associated infrastructure areas will consist of digging into the superficial sediment cover as well as underlying deeper bedrock. These excavations will change the existing topography and may possibly destroy or even permanently close-in fossils at or below the ground surface. These fossils will then be lost for research. Impacts on Palaeontological Heritage are only likely to happen within the construction phase. No impacts are expected to occur during the operation phase or decommissioning phase.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Low	High	Negative	High	Low	High
With Mitigation	Medium	Low	High	Neutral	Low	Low	High
Can the impact be reversed?			No. Destroyed fossils cannot be replaced.				
Will impact cause irreplaceable loss or resources?			Yes. Fossils cannot be replaced.				
Can impact be avoided, managed or mitigated?			Yes. The impact can be mitigated by the Chance find protocol.				

- Mitigation measures to reduce residual risk or enhance opportunities:
- If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.

Impact Phase: Construction/ Operation/Decommissioning	
• A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates. • Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found. • Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary. • The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sandbags. The Heritage agency will also be able to advise on the most suitable method of protection of the find. • If the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO. Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site. • Once the Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.	
Residual impact	Loss of Fossil Heritage through destruction of sub-soil and rock layers.

Impact Phase: Construction, Operation and Decommissioning							
Potential impact description: Damage or destruction to archaeological heritage.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Can the impact be reversed?			No. Destruction to heritage sites is permeant.				
Will impact cause irreplaceable loss or resources?			Yes. Heritage sites are unique and irreplicable.				
Can impact be avoided, managed or mitigated?			Yes. Follow mitigation measures as described by SAHRA				
Mitigation measures to reduce residual risk or enhance opportunities: • Chance find protocol must be implemented							
Residual impact	Yes, but acceptable as of low negative significance						

10.6 VISUAL AND LANDSCAPE

The potential impact ratings are based on the worst-case scenario and when the impacts of all aspects of the Project are taken together i.e. this includes the Boshoek Solar 1 Facility and the Boshoek Solar 1 PV Grid Connection. It is anticipated that visual impacts could result from the activities and infrastructure in all the Project phases i.e. construction, operational, and decommissioning.

The significance of potential impacts can be reduced to some degree, should the proposed mitigation options be rigorously applied and managed throughout the life of the Project.

10.6.1 CONSTRUCTION PHASE

Construction activities include the removal of bushveld and grassland vegetation, earthworks required to create building terraces for substation and preparation of the internal roads as well as excavations for the array structures foundations, and the erection of the PV arrays and associated infrastructure. Construction activities would negatively affect the landscape's visual quality and sense of place relative to its baseline as they would contrast with the patterns that currently define the structure of the landscape. However, the greatest impact would be on the site itself.

The worst-case impact on the visual environment during the construction phase is assessed to have a moderate severity over a localized area (but extend beyond the site boundary) and would occur over the short-term (less than the life of the project). The probability of the unmitigated impact is medium, resulting in a predicted MEDIUM significance of negative impact. The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain MEDIUM.

CONSTRUCTION

Potential impact description: Visual Impact
Change of the landscape characteristics and key views i.e. visual intrusion

	Severity	Extent	Duration	Status	Consequence	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	MEDIUM	Medium
With Mitigation	Medium	Medium	Low	Negative	Medium	Medim	MEDIUM	Medium
Can the impact be reversed?			Yes – by removing the infrastructure and rehabilitating the disturbed areas					
Will impact cause irreplaceable loss or resources?			No – the resource will be returned to almost its original state after rehabilitation					
Can impact be avoided, managed, or mitigated?			No – the impact is highly visible from the arterial and local access roads, and it is not possible to significantly reduce the visibility during the construction phase					

- Suppress dust during construction.
- Limit area of disturbance for access roads, substations and construction camp sites.
- Locate construction camps and all related facilities such as stockpiles, lay-down areas, batching plants in areas already impacted such as existing farmyards or in unobtrusive locations away from the main visual receptors.
- Limit access tracks for construction and maintenance vehicles to existing roads where possible. Once established do not allow random access through the veld.
- Suppress dust during construction.
- Blend edges of road and platforms with surrounding landscape.
- Rehabilitate exposed disturbed areas as soon as is possible.
- Avoid vegetation stripping in straight lines but rather non-geometric shapes that blend with the landscape. Maintain a 10m vegetative buffer (of existing and/or established indigenous trees) outside the project footprint and along the adjacent public roads to restrict visibility and to shield against potential glare to motorists.
- Limit need for security lighting and ensure it is aimed away from sensitive receptor areas.
- Use non-reflective materials.

CONSTRUCTION	
• Paint all other project infrastructure elements such as operational buildings a dark colour to blend with the general environment.	
Residual impact	Medium significance after mitigation

10.6.2 OPERATION PHASE

Operational activities include the regular cleaning of the PV modules, vegetation management under and around the PV modules and maintenance of all other infrastructural components. Security lighting and other lighting associated with the movement of security vehicles at night. These activities along with the physical presence of the Project components (solar arrays, support infrastructure and the OHPL) day and night, constitute the visual impact.

The worst-case impact on the visual environment during the operational phase is assessed to have a medium severity over a localized area (but extend beyond the site boundary) and would occur over the medium terms (reversible over the life of the project). The probability of the unmitigated impact is medium resulting in a MODERATE predicted significance negative impact. A moderate impact implies a noticeable impact with unavoidable consequence, which will need to be accepted if the project is allowed to proceed.

Mitigation measures are feasible and can reduce the visual impact over time (once the proposed tree screens are established, where required). The impact with mitigation is predicted to be LOW.

OPERATIONAL

Potential impact description: Visual Impact
Change of the landscape characteristics and key views i.e. visual intrusion and potential glint and glare

	Severity	**Extent**	**Duration**	**Status**	**Consequence**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	MEDIUM	Medium
With Mitigation	Low	Medium	Low	Negative	Low	Low	LOW	Medium

Can the impact be reversed?	Yes – by removing the infrastructure and rehabilitating the disturbed area
Will impact cause irreplaceable loss or resources?	No – the resource will be returned to almost its original state after rehabilitation
Can impact be avoided, managed, or mitigated?	Yes – by ensuring that existing bushveld is maintained in a 20m buffer zone around the properties and where there is no bushveld planting indigenous tree screens and maintaining the existing vegetation.

- Suppress dust during operation by maintaining access roads, substations and office/admin areas with appropriate dust suppressants.
- Ensure effect maintenance of the tree screens, where required, around the property.
- Limit need for security lighting and ensure it is aimed away from sensitive receptor areas.

OPERATIONAL	
• Use non-reflective materials. • Paint all other project infrastructure elements such as operational buildings a dark colour to blend with the general environment.	
Residual impact	Low significance with successful mitigation

10.6.3 DECOMMISSIONING PHASE

Decommissioning and closure activities include the dismantling and removal of infrastructure and the rehabilitation of the site back to its current, mostly natural, state.

The worst-case impact on the visual environment during the construction phase is assessed to have a medium severity over a localized area (but extend beyond the site boundary) and would occur over the short-term (less than the life of the project). The probability of the unmitigated impact is medium, resulting in a predicted LOW significance of negative impact. The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain LOW.

DECOMMISSIONING

Potential impact description: Visual Impact
Change of the landscape characteristics and key views i.e. visual intrusion

	Severity	**Extent**	**Duration**	**Status**	**Consequence**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Low	Medium	Low	Negative	Low	Medium	MEDIUM	Medium
With Mitigation	Low	Medium	Low	Negative	Low	Medim	MEDIUM	Medium
Can the impact be reversed?	Yes – by removing the infrastructure and rehabilitating the disturbed area							
Will impact cause irreplaceable loss or resources?	No – the resource will be returned to almost its original state after rehabilitation							
Can impact be avoided, managed, or mitigated?	No – the impact is highly visible from the arterial road, and it is not possible to significantly reduce the visibility during the construction phase							

• Remove all project components from site. • Rip all compacted hard surfaces such as platforms, words areas, access and service roads etc. and reshape to blend with the surrounding landscape. • Rehabilitate/revegetate all disturbed areas to visually the original state by shaping and planting.	
Residual impact	Minor but generally none (The rehabilitated areas might not be visually compatible with the existing surrounding vegetation).

10.7 SOCIO-ECONOMIC

10.7.1 CONSTRUCTION PHASE

Most social impacts associated with the project are anticipated to occur during the construction phase of the development and are typical of the type of social impacts generally associated with construction activities. These impacts will be temporary and short-term (~24 months) but could have long-term effects on the surrounding social environment if not planned or managed appropriately. It is therefore necessary that the detailed design phase be conducted in such a manner so as not to result in permanent social impacts associated with the ill-placement of project components or associated infrastructure or result in the mismanagement of the construction phase activities.

The positive and negative social impacts identified that will be assessed for the construction phase include:

- Direct employment opportunities;
- Multiplier Effects on the Local Economy;
- Influx of jobseekers and change in population;
- Safety and Security;
- Local Services/Resources;
- Impacts on daily living and movement patterns;
- Nuisance Impacts; and
- Impacts associated with the loss of agricultural land.

Construction

Potential impact description: Employment opportunities and skills development

The impact will occur at a local and regional level. The creation of employment opportunities will assist to an extent in alleviating unemployment levels within the area. Construction of the project will result in the creation of several direct and indirect employment opportunities, which will assist in addressing unemployment levels within the area and aid in the skills development of communities in the area.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Low	Medium	Low	Positive	Medium	Low	Medium
With Mitigation	Medium	Medium	Low	Positive	Medium	Medium	Medium
Can the impact be reversed?			Yes				
Will impact cause irreplaceable loss or resources?			No, the impact will be positive				
Can impact be avoided, managed, or mitigated?			Yes, enhancements will result in increased positive outcomes				
Mitigation measures to reduce residual risk or enhance opportunities:							

Construction

To enhance local employment, skills development and business opportunities associated with the construction phase the following measures should be implemented:

- It is recommended that the local employment policy be adopted where possible to maximizes the opportunities made available to the local labour force. The project should make it a requirement for contractors to implement a 'locals first' policy, especially for semi and low skilled job categories., if this is not possible, then the broader focus areas should be considered for sourcing workers.
- Employment opportunities will be for the immediate local area Rustenburg and Kgetlengrivier LM, if this is not possible, then the broader focus areas should be considered for sourcing employees.
- During the recruitment selection process, consideration must be given to women.
- It is recommended that realistic local recruitment targets be set for the construction phase.
- Training and skills development programmes should be initiated prior to the commencement of the construction phase.

Residual impact	Improved pool of skills and experience in the local area

Construction

Potential impact description: Multiplier effects on the local economy

The construction period will last for two years at most and will include mostly local and some regional impacts. The project will drive increased cash flow from wages, local procurement, economic growth, taxes, LED, and Human Resource Development (HRD) initiatives. Will depend on the proportion of local spending by employees; the capacity of local enterprises to supply; the effectiveness of LED and HRD initiatives; and contributions to local government.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Low	Medium	Low	Positive	Medium	Low	Medium
With Mitigation	Medium	Medium	Low	Positive	Medium	Medium	Medium

Can the impact be reversed?	Yes
Will impact cause irreplaceable loss or resources?	No, the impact will be positive
Can impact be avoided, managed, or mitigated?	Yes, enhancements will result in increased positive outcomes

Mitigation measures to reduce residual risk or enhance opportunities:

- It is recommended that the developer adopts a local procurement policy to maximiser the benefit to the local economy, where feasible (Rustenburg and Kgetlengrivier LM).
- South Africa Boshoek Solar 1 (Pty) Ltd should develop a database of local companies, specifically Historically Disadvantaged (HD) companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work, where applicable.

Construction	
• It is a requirement to source as many goods and services as possible from the local area. • Engage with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods, and products from local suppliers, where feasible.	
Residual impact	Improved local service sector and growth in local business.

Construction

Potential impact description: Influx of Jobseekers and change of population.

The influx of people seeking jobs from outside the area, or even province could lead to negative impacts. local residents and businesses could be affected by the increase of people through stress on local services as well as an increase in social ills. The area has few existing issues with crime and social disruptions. Even a small increase in people could have an impact.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
With Mitigation	Low	Medium	Low	Negative	Medium	Low	Medium
Can the impact be reversed?			Yes, after the construction phase, people will go elsewhere for work.				
Will impact cause irreplaceable loss or resources?			No, it is likely to be temporary.				
Can impact be avoided, managed, or mitigated?			Yes, steps can be taken to lessen the amount of people that come from outside areas.				

Mitigation measures to reduce residual risk or enhance opportunities:

- Access in and out of the construction area should be strictly controlled by a security company.
- The appointed Engineering, Procurement and Construction (EPC) contractor must appoint a security company and appropriate security procedures are to be implemented.
- Advertisement for employment opportunities should be targeted and preferably focused on local LMs.
- With the preference and focus on hiring locally, it should reduce the amount of people coming to look for work from further afield.
- Access in and out of the construction area should be strictly controlled by a security company.
- A Community Liaison Officer should be appointed, and an appropriate grievance mechanism implemented. A method of communication should be implemented whereby procedures to lodge complaints are set out for the local community to express any complaints or grievances with the construction process.

Residual impact	None anticipated. Impacts will be significantly reduced once construction is completed.

Construction

Potential impact description: Safety and security

Construction

The impact will affect road users and local residents from nearby communities. It could place the safety and security of neighboring community members and road users at risk. Fear of crime is often at high levels during the construction phase of the project.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Low	Negative	Medium	Low	Medium
With Mitigation	Low	Low	Low	Negative	Low	Low	Medium
Can the impact be reversed?			Yes, after the construction phase, people will go elsewhere for work.				
Will impact cause irreplaceable loss or resources?			No, it is likely to be temporary.				
Can impact be avoided, managed, or mitigated?			Yes, steps can be taken to avoid, manage and mitigate the impact.				

Mitigation measures to reduce residual risk or enhance opportunities:

- Access in and out of the construction area should be strictly controlled by a security company.
- The appointed Engineering, Procurement and Construction (EPC) contractor must appoint a security company and appropriate security procedures are to be implemented.
- The contractor must ensure that open fires on the site for heating, smoking, or cooking are not allowed except in designated areas.
- Contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff.
- A comprehensive employee induction programme which covers land access protocols, fire management and road safety should be prepared.
- A Community Liaison Officer should be appointed, and an appropriate grievance mechanism implemented. A method of communication should be implemented whereby procedures to lodge complaints are set out for the local community to express any complaints or grievances with the construction process.

Residual impact	None anticipated. Impacts will be removed once construction is completed.

Construction

Potential impact description: Increased pressure on local services/resources

Construction may affect resource management on the local district municipal level, intensify existing service delivery and resource problems and backlogs, especially water sanitation, and medical services. Population influx will affect the ability of the local municipality to meet increased demand.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Low	Negative	Medium	Low	Medium
With Mitigation	Low	Low	Low	Negative	Low	Low	Medium

Construction	
Can the impact be reversed?	Yes, after the construction phase, people will go elsewhere for work.
Will impact cause irreplaceable loss or resources?	No, it is likely to be temporary.
Can impact be avoided, managed, or mitigated?	Yes, steps can be taken to avoid, manage and mitigate the impact.

Mitigation measures to reduce residual risk or enhance opportunities:

- Preference should be given to local jobseekers to lessen the pressure on local services as there will not be a high number of people adding to the pressure on local services.

Residual impact	Possibility of outside workers remaining in the area after construction is completed and subsequent pressure on local infrastructure.

Construction

Potential impact description: Disruption of daily living and movement patterns

The project will affect road users from nearby communities. The magnitude will be increased due to the limited number of people in the area. Small increases could be significant in a low-population area.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Low	Negative	High	Low	Medium
With Mitigation	Low	Low	Low	Negative	Medium	Low	High
Can the impact be reversed?			Yes, levels of traffic should lessen a great deal after construction				
Will impact cause irreplaceable loss or resources?			No, it is likely to be temporary.				
Can impact be avoided, managed, or mitigated?			Yes, steps can be taken to mitigate some of the negative impacts				

Mitigation measures to reduce residual risk or enhance opportunities:

- All vehicles must be road-worthy and drivers must be qualified, obey traffic rules, follow speed limits, and be made aware of potential road safety issues.
- Heavy vehicles should be inspected regularly to ensure their road safety worthiness.
- Implement penalties for reckless driving for the drivers of heavy vehicles to enforce compliance with traffic rules.
- Avoid heavy vehicle activity during 'peak' hours (when people are driving to and from work).
- The developer and engineering, procurement, and construction (EPC) contractors must ensure that any damage/wear and tear caused by construction-related traffic to the roads is repaired.
- A comprehensive employee induction programme which covers land access protocols and road safety should be prepared.

Construction
• A Community Liaison Officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out for the local community to express any complaints or grievances with the construction process.

Residual impact	None anticipated.

Construction

Potential impact description: Nuisance impacts (noise & dust)

Dust generated from site clearance and noise during construction from equipment and other source of noise including vehicle traffic during the construction phase. This will remain within the project extent from construction activities. Dust impacts and noise nuisance from construction activities. The movement of heavy equipment associated with construction has a high potential to create noise and dust in the area.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Mow	Mow	Low	Negative	High	Low	Mow
With Mitigation	Low	Low	Low	Negative	Mow	Low	High

Can the impact be reversed?	Yes, after the construction phase, people will go elsewhere for work.
Will impact cause irreplaceable loss or resources?	No, it is likely to be temporary.
Can impact be avoided, managed, or mitigated?	Yes, steps can be taken to avoid, manage and mitigate the impact.

Mitigation measures to reduce residual risk or enhance opportunities:

- All vehicles must be road-worthy and drivers must be qualified, obey traffic rules, follow speed limits, and be made aware of potential road safety issues.
- Heavy vehicles should be inspected regularly to ensure their road safety worthiness.
- Implement penalties for reckless driving for the drivers of heavy vehicles to enforce compliance with traffic rules.
- Avoid heavy vehicle activity during 'peak' hours (when people are driving to and from work).
- The developer and engineering, procurement, and construction (EPC) contractors must ensure that any damage/wear and tear caused by construction-related traffic to the roads is repaired.
- A comprehensive employee induction programme which covers land access protocols and road safety should be prepared.
- A Community Liaison Officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.

Residual impact	None anticipated.

Construction

Potential impact description: Impacts associated with the loss of agricultural land, (as per the Soil and Agricultural Report)

An agricultural impact is a change to the future agricultural production potential of land. In most developments, including the one being assessed here, this is primarily caused by the exclusion of agriculture from the footprint of the development

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Low	Negative	High	Low	Medium
With Mitigation	Low	Low	Low	Negative	Medium	Low	High
Can the impact be reversed?			Yes, the use of the land for solar power will cause minimal loss of agricultural production potential				
Will impact cause irreplaceable loss or resources?			No, the use of the land for solar power will cause minimal loss of agricultural production potential				
Can impact be avoided, managed, or mitigated?			Yes, steps can be taken to mitigate some of the negative impacts associated with construction.				

Mitigation measures to reduce residual risk or enhance opportunities:

- A system of stormwater management, which will prevent erosion on and downstream of the site, will be an inherent part of the engineering design on site.
- Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 30 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-filled, the topsoil must be back-filled last, so that it remains at the surface. Topsoil should only be stripped in areas that are excavated. Across most of the site, including construction lay-down areas, it will be much more effective for rehabilitation, to retain the topsoil in place. If levelling requires significant cutting, topsoil should be temporarily stockpiled and then re-spread after cutting, so that there is a covering of topsoil over the entire cut surface. It will be advantageous to have topsoil and vegetation cover below the panels during the operational phase to control dust and erosion.

Residual impact	None anticipated.

10.7.2 OPERATION PHASE

It is anticipated that the Boshoek Solar 1 will operate for up to 25 years (which is equivalent to the operational lifespan of the project). Most positive outcomes are associated with the operational phase of the project. If managed appropriately, the positive impact can be effectively enhanced, and the negative impacts mitigated.

The potential positive and negative social impacts that could arise as a result of the operation of the proposed project include the following:

- Direct employment and skills development opportunities;
- Development of clean, renewable energy infrastructure;
- Visual impact and impact on sense of place;

- Benefits Associated with Socio-Economic Contributions; and
- Impacts associated with the loss of agricultural land.

Operation

Potential impact description: Direct Employment and skills development during operation

It is anticipated that ~10 jobs will be generated during the operation phase, and the facility will be operational for ~25 years. Several highly skilled personnel may need to be recruited from outside the local municipal area.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Low	Medium	High	Positive	Medium	Low	Medium
With Mitigation	Medium	Medium	High	Positive	High	Low	High
Can the impact be reversed?			Yes				
Will impact cause irreplaceable loss or resources?			No, the impact is likely to be positive				
Can impact be avoided, managed, or mitigated?			Yes, steps can be taken to enhance the positive impacts associate with the operation phase of the project.				

Mitigation measures to reduce residual risk or enhance opportunities:

- A local employment policy should be adopted by the developer to maximizes the project opportunities being made available to the local community.
- Enhance employment opportunities for the immediate local area, Rustenburg, and Kgetlengrivier LM. If this is not possible, then the broader focus areas should be considered for sourcing employees.
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.
- The developer should establish vocational training programs for the local employees to promote the development of skills.

Residual impact	An improved pool of skills and experience in the local area

Operation

Potential impact description: Development of clean, renewable energy infrastructure.

Bringing renewable energy sector to Rustenburg and Kgetlengrivier LM economy may contribute to the diversification of the local economy and provide greater economic stability. The generation of renewable energy will contribute to South Africa's electricity generation capacity. As the project is only proposed to be 150MW, the contribution will be limited. Facility will help reduce the total carbon emissions associated with non-renewable energy generation

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	High	Positive	High	Low	High

Operation							
With Mitigation	Medium	Medium	High	Positive	High	Low	High
Can the impact be reversed?			Yes, the project is due to operate for 25 years after which it can be closed and rehabilitated.				
Will impact cause irreplaceable loss or resources?			No, the impact is likely to be positive				
Can impact be avoided, managed, or mitigated?			No, as none is necessary				

Mitigation measures to reduce residual risk or enhance opportunities:

None required.

Residual impact	Reduce carbon emissions through the use of renewable energy and contribute to reducing global warming

Operation

Potential impact description: Visual impacts and impacts on sense of place, (as per visual report)

Impact on the sense of place relates to the change in the landscape character and visual impact of the proposed solar energy facility. The impact is dependent on the demographics of the population that resides in the area and their perceptions There are already existing power and transmission lines, roads, substations, and other infrastructure that affect the area.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	High	Negative	High	Medium	Medium
With Mitigation	Low	Low	High	Negative	Medium	Low	High
Can the impact be reversed?			Yes, the project is due to operate for 25 years after which it can be closed and rehabilitated.				
Will impact cause irreplaceable loss or resources?			No, the impact is likely to be positive				
Can impact be avoided, managed, or mitigated?			Yes, steps can be taken to mitigate negative impacts.				

Mitigation measures to reduce residual risk or enhance opportunities:

- Suppress dust during operation by maintaining access roads, substations, and office/admin areas with appropriate dust suppressants.
- Ensure effective maintenance of the tree screens, where required, around the property.
- Limit need for security lighting and ensure it is aimed away from sensitive receptor areas.
- Use non-reflective materials.

Operation	
• Paint all other project infrastructure elements such as operational buildings a dark colour to blend with the general environment.	
Residual impact	Low significance with successful mitigation

Operation							
Potential impact description: Benefits associated with socio-economic contributions. The economic opportunities created with the operation facility and grid will benefit the lives of the people involved as well as their dependents. The benefits of the project will likely be felt by local to regional people. The positive outcomes will persist for the duration of the project.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	High	Positive	High	Low	High
With Mitigation	Medium	Medium	High	Positive	High	Low	High
Can the impact be reversed?			Yes, the project is due to operate for 25 years after which it can be closed and rehabilitated.				
Will impact cause irreplaceable loss or resources?			No, the impact is likely to be positive				
Can impact be avoided, managed, or mitigated?			Yes, steps can be taken to enhance positive impacts				
Mitigation measures to reduce residual risk or enhance opportunities: • Emphasis should be placed on prioritising local contractors, subcontractors, and suppliers. • Skills development programs and opportunities for on-the-job experience should be created. • Excess power from the site should where possible be used for the benefit of the local energy supply.							
Residual impact	• The increase in opportunities for local and regional people. • Increased skill pool for similar projects, or where skills are transferable. • Security and income for local families and dependents.						

Operation							
Potential impact description: Impacts associated with the loss of agricultural land, (as per the Soil and Agricultural Report) An agricultural impact is a change to the future agricultural production potential of land. In most developments, including the one being assessed here, this is primarily caused by the exclusion of agriculture from the footprint of the development							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**

Operation							
Without Mitigation	Medium	Medium	High	Negative	High	Low	Medium
With Mitigation	Low	Low	High	Negative	M	Low	High
Can the impact be reversed?			Yes, the use of the land for solar power will cause minimal loss of agricultural production potential				
Will impact cause irreplaceable loss or resources?			No, the use of the land for solar power will cause minimal loss of agricultural production potential				
Can impact be avoided, managed, or mitigated?			Yes, steps can be taken to mitigate some of the negative impacts associated with the operation of the facility.				

Mitigation measures to reduce residual risk or enhance opportunities:

- A system of stormwater management, which will prevent erosion on and downstream of the site, will be an inherent part of the engineering design on site.
- Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 30 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-filled, the topsoil must be back-filled last, so that it remains at the surface. Topsoil should only be stripped in areas that are excavated. Across most of the site, including construction lay-down areas, it will be much more effective for rehabilitation, to retain the topsoil in place. If levelling requires significant cutting, topsoil should be temporarily stockpiled and then re-spread after cutting, so that there is a covering of topsoil over the entire cut surface. It will be advantageous to have topsoil and vegetation cover below the panels during the operational phase to control dust and erosion.

Residual impact	None anticipated.

10.8 TRAFFIC AND TRANSPORTATION

There will be a notable increase in traffic volumes on the public road network within the study area, during the construction phase of the proposed development and less conspicuous traffic volumes during the operational phase. 1. The cumulative traffic impact of planned construction of various Solar PV facilities within 35 km (within 5 km from the site) could coincide with the Boshoek Solar 1 facility. The cumulative traffic is significant and could increase traffic congestion on the R565 at the OK Grocer shopping center hub.

The development traffic involving staff/worker transport will produce substantial commuter peak hour trips on the road network, where a few areas of concern are identified. This will be more so with a cumulative development scenario. Consequently, a Traffic Impact Assessment is required to determine development traffic impact and to effectively manage the increase in traffic due to the development/solar PV facility.

10.8.1 CONSTRUCTION PHASE

The following impacts are identified for the Solar PV Facility project lifecycle.

Construction:

- Traffic congestion in Boshoek;
- Road safety at D114/R565 intersection;

- Road safety at D114/site access road intersection;
- Road safety at site access;
- Degradation of gravel site access road;
- Dust on gravel site access road; and
- Pedestrian safety on-site.

Construction
Potential impact description: Traffic congestion Increased development related light and heavy vehicles traffic flow on the R565 route to site, resulting in more traffic congestion in the PM at the Boshoek OK Grocer shopping hub.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Low	Negative	High	Medium	Medium
With Mitigation	Low	Medium	Low	Negative	Medium	Medium	Medium
Can the impact be reversed?			Yes. This is temporary during Construction				
Will the impact cause irreplaceable loss of resources?			No				
Can the impact be avoided, managed or mitigated?			Yes, this can mitigated or managed				

Mitigation measures to reduce risk or enhance opportunities:

- Improving traffic road markings on R565 in Boshoek.
- Focused traffic law enforcement on R565 at Boshoek shopping hub particularly during PM peak hours.
- Plan for light vehicles to/from site to travel outside the traffic peak hours, and or accommodate at least 50% of specialists and artisans in buses (1 bus equates to 50 vehicles) to/from site.

Construction
Potential impact description: Road safety at DR114/R565 intersection Poor road markings at the D114/R565 intersection in Boshoek (see pictures below) could result in vehicle crashes due to motorists misreading the intersection.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	High	Medium	Low	Negative	High	Medium	High
With Mitigation	High	Medium	Low	Positive	Low	Low	High
Can the impact be reversed?			Yes. Improved road markings will extend beyond the project construction and benefit all road users				

Construction	
Will the impact cause irreplaceable loss of resources?	Yes, loss of life or disability due to crashes
Can the impact be avoided, managed or mitigated?	Yes, this can mitigated or managed

Mitigation measures to reduce risk or enhance opportunities:

- Improving road markings on D114/R565 intersection in Boshoek, particularly to clearly indicate that vehicles need to keep-left of the splitter island.

Construction

Potential impact description: Road safety at DR114/Site access road intersection

There is potential for vehicle crashes at D114/gravel site access road intersection with motorists not expecting construction vehicles at the intersection, over an extended period.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	High	Medium	Low	Negative	Medium	Medium	Medium
With Mitigation	High	Medium	Low	Negative	Low	Low	Medium

Can the impact be reversed?	Yes. This is temporary during Construction
Will the impact cause irreplaceable loss of resources?	Yes, loss of life or disability due to crashes
Can the impact be avoided, managed or mitigated?	Yes, this can mitigated or managed

Mitigation measures to reduce risk or enhance opportunities:

- Ensure construction vehicles are roadworthy, construction vehicle drivers are licensed.
- installation temporary roadworks "crossing vehicles" warning signage on the D114 approaches to the gravel site access road intersection.
- Hard surfaced 30 m of site access road to reduce materials carry into D114.
- Provide road markings and stop signage are on the gravel site access road approach to D114.
- Repair D114 road edge opposite the site access road.

Construction

Potential impact description: Road safety at site access

The site access is located on the outside of a bend however motorists sight lines are compromised by vegetation, which could result in vehicle crashes.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**

Construction							
Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium
Can the impact be reversed?	Yes. This is temporary during Construction						
Will the impact cause irreplaceable loss of resources?	Yes, loss of life or disability due to crashes						
Can the impact be avoided, managed or mitigated?	Yes, this can mitigated or managed						

Mitigation measures to reduce risk or enhance opportunities:

- Install signage warning of trucks crossing on both approaches to the site access.
- Design site access to accommodate two-way traffic flow.

Construction

Potential impact description: Degradation of gravel site access road

Additional heavy traffic on the site access road could degrade the existing road pavement with increased potential for vehicle damage or injury crashes.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	High
With Mitigation	Medium	Medium	Low	Negative	Low	Low	High
Can the impact be reversed?	Yes. This is temporary during Construction						
Will the impact cause irreplaceable loss of resources?	Yes, disability due to crashes						
Can the impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated						

Mitigation measures to reduce risk or enhance opportunities:

- Carry out regular maintenance of the gravel site access road to ensure that its condition is maintained or improved to good condition.

Construction

Potential impact description: Dust on gravel site access road

Additional traffic on gravel site access road will result in more dust. This reduces forward visibility and increased potential for crashes on the gravel site access road.

Construction							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	High
With Mitigation	Medium	Medium	Low	Negative	Low	Low	High
Can the impact be reversed?			Yes. This is temporary during Construction				
Will the impact cause irreplaceable loss of resources?			No				
Can the impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated				
Mitigation measures to reduce risk or enhance opportunities: Reduce travel speed on gravel site access road to reduce dust: • Post 50km/h speed restriction signage for construction vehicles on the gravel site access road. • Actively enforce construction vehicles to adhere to posted speed limits. • Where deemed necessary (due to wind conditions) apply appropriate dust suppressant.							

Construction							
Potential impact description: Pedestrian safety on-site Buses and light vehicles will arrive on site and park for extended periods in addition to large delivery vehicles driving on site. Site staff (skilled and semi-skilled) will need to walk to the site work area or be transported on site. This increases the risk of vehicle/pedestrian conflict and crashes on site.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	High	Low	Low	Negative	High	Medium	Medium
With Mitigation	High	Low	Low	Negative	Low	Low	High
Can the impact be reversed?			Yes. This is temporary during Construction				
Will the impact cause irreplaceable loss of resources?			Yes, possible death or disability				
Can the impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated				
Mitigation measures to reduce risk or enhance opportunities: • Designing and implementing a well-designed parking area (s) with clearly defined well-lit pedestrian walkways separated from delivery and operational traffic.							

Construction
• Implementing well considered on-site protocols (appropriate vehicles, boarding and alighting areas and routes on site).

10.8.1 OPERATION PHASE

During the operational phase of the development, the traffic volumes are considerably less than during the construction phase of the proposed development. Thus, all impacts associated with increased traffic volumes have been omitted as no impacts have been identified for this phase.

10.8.2 DECOMMISSIONING PHASE

Trip generation at the decommissioning stage is likely to be outside commuter peak hours.

Decommissioning will entail less traffic than the construction phase, and recyclable components would be transported to appropriate recycling facilities. Other materials would be transported to the local dump if not recyclable or sold to local scrap merchants or other buyers if the items have salvage value.

Decommissioning should be in accordance with the agreement reached with the affected landowners.

Daily trips for the decommissioning period are expected to be low and will typically comprise dump trucks or low-bed vehicles, with equipment and components cut to size on site.

Decommissioning
Potential impact description: Road safety at site access The site access is located on the outside of a bend however motorists sight lines are compromised by vegetation, which could result in vehicle crashes.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium
Can the impact be reversed?			Yes. This is temporary during Construction				
Will the impact cause irreplaceable loss of resources?			Yes, loss of life or disability due to crashes				
Can the impact be avoided, managed or mitigated?			Yes, this can mitigated or managed				

Mitigation measures to reduce risk or enhance opportunities:

- Install signage warning of trucks crossing on both approaches to the site access.

Decommissioning
Potential impact description: Degradation of gravel site access road

Decommissioning

Additional heavy traffic on the site access road could degrade the existing road pavement with increased potential for vehicle damage or injury crashes.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
With Mitigation	Medium	Medium	Low	Negative	Low	Low	Medium
Can the impact be reversed?			Yes. This is temporary during Decommissioning				
Will the impact cause irreplaceable loss of resources?			Possibly, disability due to crashes				
Can the impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated				

Mitigation measures to reduce risk or enhance opportunities:

- Carry out regular maintenance of the gravel site access road to ensure that its condition is maintained or improved to good condition.

Decommissioning

Potential impact description: Dust on gravel site access road

Additional traffic on gravel site access road will result in more dust. This reduces forward visibility and increases potential for crashes on the gravel road.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	High	Low	Low	Negative	Medium	Medium	Medium
With Mitigation	Low	Low	Low	Negative	Low	Low	Medium
Can the impact be reversed?			Yes. This is temporary during Decommissioning				
Will the impact cause irreplaceable loss of resources?			Possibly, disability due to crashes				
Can the impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated				

Mitigation measures to reduce risk or enhance opportunities:

Reduce travel speed on gravel site access road to reduce dust:

- Post 50km/h speed restriction signage for construction vehicles on gravel site access road.
- Actively enforce construction vehicles to adhere to posted speed limits.

Decommissioning

Potential impact description: Pedestrian safety on site

Buses and light vehicles will arrive on site and park for extended periods in addition to large delivery vehicles driving on site. Site staff (skilled and semi-skilled) will need to walk to the site work area or be transported on site. This increases the risk of vehicle/pedestrian conflict and crashes on site.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	High	Low	Low	Negative	Medium	Medium	Medium
With Mitigation	Medium	Low	Low	Negative	Low	Low	Medium
Can the impact be reversed?			Yes. This is temporary during Decommissioning				
Will the impact cause irreplaceable loss of resources?			Possibly, disability due to crashes				
Can the impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated				

Mitigation measures to reduce risk or enhance opportunities:

- Designing and implementing a well-designed parking area (s) with clearly defined well-lit pedestrian walkways separated from delivery and operational traffic.
- Implementing well considered on-site protocols (appropriate vehicles, boarding and alighting areas and routes on site).

11. CUMULATIVE IMPACTS

The cumulative impact assessment considered the combined impact of the remaining and other renewable projects within a 35 km radius, that are also in the development phase and the associated grid lines. The combination of the Boshoek SEFs 1, 2 and 3, as well as other similar renewable energy projects, either existing or proposed, was considered (at the time of the start of the study and availability of data) to assess cumulative visual impacts within a 35 km radius of the proposed project. Not all of these are within 35 km, but were considered as they are part of the same landscape. Developments considered during the assessment are named below:

- Boshoek 2 SEF; and
- Boshoek 3 SEF.

According to the REEA Database (quarter 1, 2023), no renewable energy applications have been made for properties that are located within a 30km radius of the PV Site. There are two other known renewable energy applications in close proximity to the Project i.e. Boshoek 2 SEFe and Boshoek 3 SEF. These two applications will be submitted concurrently with the Boshoek 1 SEF application and the respective EIA processes are ran concurrently.

The latest REEA Database (quarter 1, 2024) was released on 31 May 2024, after the assessment process for Boshoek Solar 3 was in its advanced stages.

The database identifies three additional solar PV facilities within the 35km radius of the proposed project, namely:

- Onderstepoort Solar 1 (240 MW);
- Onderstepoort Solar 2 (240 MW); and,
- Rhino Solar (65 MW).

In assessing cumulative impacts, the EAP and specialists have considered the abovementioned projects within the 35 km radius of the proposed Boshoek Solar 1.

11.1 SOIL, LAND USE AND AGRICULTURAL POTENTIAL

This cumulative impact assessment determines the quantitative loss of agricultural land if all renewable energy project applications within a 50 km radius become operational. These projects are listed in Table 11-1 below. In quantifying the cumulative impact, the area of land taken out of agricultural use as a result of all the projects listed in Table 11-1 (total generation capacity of 515 MW) will amount to a total of approximately 1,288 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 50 km radius (approximately 785,300 ha), this amounts to only 0.16% of the surface area. This is well 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.

TABLE 11-1 TABLE OF ALL PROJECTS THAT WERE INCLUDED IN THE CUMULATIVE IMPACT ASSESSMENT

DFFE Reference	Project name	Technology	Capacity (MW)
14/12/16/3/3/1/498	MatauPV	PV	15
14/12/16/3/3/2/414	PV on Portion 44 Of Farm Kortfontein No.461	PV	50
14/12/16/3/3/2/2508	Boshoek Solar 1	PV	150
14/12/16/3/3/2/2509	Boshoek Solar 2	PV	150
14/12/16/3/3/2/2510	Boshoek Solar 3	PV	150
Total solar			515

All the projects contributing to cumulative impact for this assessment have the same agricultural impacts in a very similar agricultural environment, and therefore the same mitigation measures apply to all.

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 creates cumulative impact in such places. However, this is acceptable because it also 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.

Furthermore, it should be noted that there are few land uses, other than renewable energy, that are competing for agricultural land use in this area. The cumulative impact from developments, other than renewable energy, is therefore likely to be low.

The loss of agricultural potential by soil degradation can effectively be prevented for renewable energy developments by generic mitigation measures that are all inherent in the project engineering and/or are standard, best-practice for construction sites. Soil degradation does not therefore pose a cumulative impact 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, from a cumulative agricultural impact perspective, that the development be approved.

11.1.1 ADDENDUM TO THE CUMULATIVE IMPACT FOR SOIL, LAND USE AND AGRICULTURAL POTENTIAL

The new REEA database has been released since the completion of the agricultural assessments for the Boshoek solar energy facilities and additional projects now need to be included in the cumulative impact assessment.

The amended cumulative impact is now as follows:

This cumulative impact assessment determines the quantitative loss of agricultural land if all renewable energy project applications within a 50 km radius become operational. These projects are listed in Table 1 below. Note that electrical grid infrastructure projects do not contribute to a loss of agricultural land and are not therefore included in this calculation of cumulative land loss.

The area of land taken out of agricultural use as a result of all the projects listed below (total generation capacity of 1060 MW) will amount to a total of approximately 2650 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 50 km radius (approximately 785,300 ha), this amounts to only 0.94% of the surface area. This is within an acceptable limit in terms of loss of lower potential agricultural land, most of which is only suitable for grazing.

The cumulative impact of loss of future agricultural production potential is assessed as low, which is the same as the original assessment report. It will not have an unacceptable negative impact on the agricultural production capability of the area, and it is therefore still recommended, from a cumulative agricultural impact perspective, that the development be approved.

TABLE 11-2 TABLE OF ALL PROJECTS THAT WERE INCLUDED IN THE CUMULATIVE IMPACT ASSESSMENT

DFFE Reference	Project name	Technology	Capacity (MW)
14/12/16/3/3/1/498	MatauPV	PV	15
14/12/16/3/3/2/414	PV on Portion 44 Of Farm Kortfontein No.461	PV	50
TBC	Boshoek Solar 1	PV	150
TBC	Boshoek Solar 2	PV	150
TBC	Boshoek Solar 3	PV	150
14/12/16/3/3/2/2320	The Proposed 240 MW Onderstepoort Solar 2 Photovoltaic Project north west of Rustenburg, North West Province	PV	240
14/12/16/3/3/2/2319	The Proposed 240 MW Onderstepoort Solar 1 Photovoltaic Project north west of Rustenburg, North West Province	PV	240
14/12/16/3/3/2/2321	The Proposed 65 MW Rhino Solar Photovoltaic Project north west of Rustenburg, North West Province.	PV	65
Total solar			1060

11.2 FRESHWATER AND WETLANDS (AQUATICS)

Of these REFs only the Boshoek PV Solar developments (all three facilities) is located within the same quaternary catchment region, primarily drained by the Selons River and the Elands River. Subsequently the other SEFs will not contribute to the cumulative impacts on the Selons River's and Elands River's catchments and tributaries and subsequently the only SEFs likely to contribute to cumulative impacts, are the three Boshoek Solar PV projects.

Freshwater Resource Studies and Assessments was also undertaken, as part of the EIA processes, for the other two Boshoek PV Solar projects (Boshoek Solar 1 and 2) and these assessments also recommend the avoidance of any freshwater resource features and furthermore has also recommended aquatic buffers. The conclusions drawn from the other two Boshoek PV Solar developments are very similar to that drawn for this study/assessment in that the proposed layouts of these facilities indicated limited impacts on their aquatic environments as the proposed structures for the most part, have avoided the delineated freshwater resource features (apart from the spanning of electrical grid lines across watercourses). Based on the findings of the other two Boshoek PV Solar developments' aquatic assessments, the relevant specialists found no objection to the authorisation of any of these SEFs, inclusive of provided recommended mitigation measures and alternatives.

Probably the most significant potential impact associated with these projects are the modification of roughage (vegetation cover) and the creation of compacted and hard engineered surfaces with the catchment areas, leading to:

- Reduced infiltration; and
- The increase in surface runoff and sediments carried into downstream freshwater resource features.

For these projects concerned, the micro-placing of infrastructure to avoid direct impacts on delineated freshwater resources, and to accommodate for recommended buffers, are highly possible and will allow for the avoidance of freshwater resource features, furthermore, reducing the impacts on the aquatic ecosystems.

All three of these projects have indicated that this is their intention with regard to mitigation, i.e. selecting the best possible layout to minimise the local and regional impacts.

Subsequently it can be concluded that the cumulative impact of the proposed project would not be significant provided mitigation measures are implemented.

Transformation of intact freshwater resource habitat could potentially compromise ecological processes as well as ecological functioning of important habitats and would contribute to habitat fragmentation and potentially disruption of habitat connectivity and furthermore impair their ability to respond to environmental fluctuations. This is especially of relevance for larger watercourses and wetlands serving as important groundwater recharge and floodwater attenuation zones, important microhabitats for various organisms and important corridor zones for faunal movement.

Mitigation measures to reduce residual risk or enhance opportunities are as follows:

- Use existing service roads as far as possible when crossing any watercourses;
- No infrastructure may be placed within the delineated watercourses and their associated buffer areas; however, the electrical gridlines may span these features;
- Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared;

- The potential stormwater impacts of the proposed developments areas should be mitigated on-site to address any erosion or water quality impacts;
- Where watercourse crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (small footprint);
- Good housekeeping measures as stipulated in the EMPr for the project should be in place where construction activities take place to prevent contamination of any freshwater features; and
- Disturbed areas should be rehabilitated through reshaping of the surface to resemble that prior to the disturbance and vegetated with suitable local indigenous vegetation.

Cumulative Impact Phase

Compromise ecological processes as well as ecological functioning of important freshwater resource habitats.

Transformation of intact freshwater resource habitat could potentially compromise ecological processes as well as ecological functioning of important habitats and would contribute to habitat fragmentation and potentially disruption of habitat connectivity and furthermore impair their ability to respond to environmental fluctuations. This is especially of relevance for larger watercourses and wetlands serving as important groundwater recharge and floodwater attenuation zones, important microhabitats for various organisms and important corridor zones for faunal movement.

	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	High	Negative	High	High	High
With Mitigation	Low	Medium	Medium	Negative	Low	Low	High
Can the impact be reversed?			Moderate to high reversibility. By implementing appropriate mitigation measures including an effective rehabilitation and re-vegetation plan during the decommission phase.				
Will impact cause irreplaceable loss or resources?			No irreplaceably loss of freshwater resources as all facilities mostly exclude any freshwater resource features from their layouts apart from the occasional spanning of electrical gridlines.				
Can impact be avoided, managed, or mitigated?			Impacts can be largely avoided.				

Mitigation measures to reduce residual risk or enhance opportunities:

- Use existing service roads as far as possible when crossing any watercourses.
- No infrastructure may be placed within the delineated watercourses and their associated buffer areas; however, the electrical gridlines may span these features.
- Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.
- The potential stormwater impacts of the proposed developments areas should be mitigated on-site to address any erosion or water quality impacts.
- Where watercourse crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (small footprint).
- Good housekeeping measures as stipulated in the EMPr for the project should be in place where construction activities take place to prevent contamination of any freshwater features.
- Disturbed areas should be rehabilitated through reshaping of the surface to resemble that prior to the disturbance and vegetated with suitable local indigenous vegetation.

Cumulative Impact Phase	
Residual impact	If the above recommended mitigation measures are strictly implemented, the residual impacts will be **very low,** with functions and ecological processes associated with the freshwater resource features being preserved.

11.2.1 ADDENDEUM TO THE CUMULATIVE IMPACT FOR FRESHWATER AND WETLANDS (AQUATICS)

The construction and operation of the Boshoek Solar 1 SEF is still expected to have a limited to very limited contribution to the cumulative impacts.

For all of these REFs, freshwater resource assessments have been conducted, and the findings and recommendations were fairly similar for all REFs, with all REFS avoiding/excluding freshwater resource features as well as their recommended buffer areas. Subsequently, all of these REFs will avoid any direct impacts on freshwater resource features. Furthermore, based on the findings of the other REFs' freshwater resource assessments, the relevant specialists found no objection to the authorisation of any of these SEFs, inclusive of provided recommended mitigation measures and alternatives.

Of the REFs located within the 50 km radius only the Boshoek PV Solar developments (all three facilities) as well as the 65 MW Rhino Solar Photovoltaic Project ("new" REF) are located within the same quaternary catchment region, primarily drained by the Selons River. Subsequently the other SEFs will not contribute to the cumulative impacts on the Selons River's catchments and tributaries and subsequently the only SEFs likely to contribute to cumulative impacts, are the three Boshoek Solar PV projects as well as the Rhino SEF.

Probably the most significant potential impact associated with these projects are the modification of roughage (vegetation cover) and the creation of compacted and hard engineered surfaces with the catchment areas, leading to:

- Reduced infiltration; and
- The increase in surface runoff and sediments carried into downstream freshwater resource features.

For these projects concerned, the micro-placing of infrastructure in order to avoid direct impacts on delineated freshwater resources, and to accommodate for recommended buffers, are highly possible and will allow for the avoidance of freshwater resource features, furthermore, reducing the impacts on the aquatic ecosystems.

All four of these projects have indicated that this is their intention with regard to mitigation, i.e. selecting the best possible layout to minimise the local and regional impacts.

Furthermore, the footprint of the Rhino SEF is fairly small and located further than 2.4 km from the Selons River. Thus, this SEF will not significantly contribute to a significant modification in drainage characteristics of the affected sub-quaternary drainage region and will also no contribute to any other potential impacts on freshwater resource features within the region.

- The addition of the three "new" facilities, will not result in any additional cumulative impacts.

- The addition of the three "new" facilities, will not result in a significant increase in the cumulative impacts that have been described and assessed within the initial study and impact assessment.
- The cumulative impacts that have been assessed within the initial study and impact assessment have been assessed as being of low significance with the implementation of mitigation measures and remain subsequently as of low significance even with the addition of the three "new" REFs.
- Subsequently, from a cumulative freshwater resource impact perspective, the development may still be approved

11.3 TERRESTRIAL BIODIVERSITY (FLORA AND FAUNA)

The construction and operation of the Boshoek Solar 1 is expected to have a limited to very limited contribution to the cumulative impacts of the area and will not:

- compromise the ecological functioning of the larger "natural" environment; and
- disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

The combined, cumulative footprint of all renewable energy projects (located within the 50 km radius) is estimated at around 4407.6 ha, covering only 0.5 % of the area within the 50 km radius (Figure 36). Of the 4407.6 ha, Boshoek Solar 1 SEF will contribute approximately 6.6 % (290 ha). The contribution of the Boshoek Solar 1 SEF, to the loss of natural/near-natural to moderately modified vegetation within the 50 km radius is even smaller as most of the project site is located within already transformed and degraded areas.

In terms of the cumulative impact on the Zeerust Thornveld Vegetation Type, all three Boshoek Solar Facilities as well as three other REFs (according to the REEA database) are located within the Zeerust Thornveld Vegetation Type. For an impact on vegetation types and ecosystems one will have to look beyond the 50 km radius, at all the REFs located completely or partially within this ecosystem/vegetation type. The combined footprint of all the REFs located within the Zeerust Thornveld Vegetation Type will be approximately 4961.2 ha and will impact only 1.2 % of the total extent of the mentioned vegetation type. The contribution of the Boshoek Solar 1 SEF itself will be very small to insignificant and thus the cumulative impact of the REFs on the affected vegetation type will be insignificant and will not impact or threaten the conservation targets as well as Red List status of this vegetation type.

The cumulative loss and transformation of intact habitats pose a significant threat to the status and ecological functioning of provincially identified Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), thereby affecting the biodiversity conservation targets outlined by the North West Province. Within a 50 km radius, five out of seven Renewable Energy Facilities (REFs) are situated within ESA 1 (natural) and/or ESA 2 (unnatural), which aids crucial corridors and nodes for wildlife movement. Among these REFs, only one (Boshoek Solar 2 SEF) is located entirely within a CBA2 Corridor Node, while another is partially situated within such a node.

Regarding ecosystem functions and services, particularly landscape connectivity, the three Boshoek Solar SEFs are expected to exert a cumulative impact due to their close proximity to one another and their adjacency to identified corridor nodes and linkages (CBAs). Although Boshoek Solar 1 and 3 are positioned within an ecological support area that connects three Corridor Nodes and a Critical Corridor Linkage, their current contribution to landscape connectivity is minimal. This is primarily due to extensive habitat transformation and degradation

on these properties, both of which are extensively used for intensive game breeding activities. These properties are divided into small game breeding camps enclosed by highly secure, electrified game fences, which are rigorously monitored, severely constraining natural movement across the area.

Furthermore, the surrounding areas of these properties are characterised by a prominent trafficked road network, further impeding connectivity within the region.

Conclusion on cumulative impacts within the 50 km radius due to this and the surrounding renewable energy developments:

- These renewable energy facilities (REFs) will impact a very small area within the 50 km radius and will subsequently result in minimal transformation of intact habitats. Subsequently, the cumulative threat posed by these developments on the ecological functioning of these habitats are very small to insignificant, and it is unlikely that these REFS will result in significant habitat fragmentation, disruption of landscape connectivity, and impair the ability of these habitat types to respond to environmental fluctuations;
- The proposed REFs will not threaten the conservation status and targets of set out for national or provincially identified conservation features;
- The loss of vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets;
- Transformation of intact, sensitive habitats could compromise the ecological functioning of these habitats and may contribute to the fragmentation of the landscape, and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations;
- The loss of biodiversity may be exacerbated;
- Invasion of exotics and invasive species into the broader area may also potentially be exacerbated;
- The loss of and transformation of the CBAs and ESAs could impact the Province's ability to meet its conservation targets (Not applicable to this SEF, as it is located outside any CBAs and ESAs); and
- The impacts identified above are assessed below during the construction, operation, and decommissioning phases of the facility, as well as before and after mitigation.

The majority of impacts associated with the development would occur during the construction phase as a result of the disturbance associated with the operation of heavy machinery in the study area and the presence of construction personnel. The major risk factors and contributing activities associated with the development are identified and briefly outlined and summarised below before the impacts are assessed. These are not necessarily a reflection of the impacts that would occur, but rather a discussion on overall potential impacts and/or extent of these potential impacts that would occur if mitigation measures were not considered and/ or sensitive areas not avoided. The assessment of these impacts is outlined in the following section.

11.3.1 ADDENDUM TO THE CUMULATIVE IMPACT FOR TERRESTRIAL BIODIVERSITY

According to the new REEA database, five REFs apart from the proposed Boshoek Solar 2 and 3 REFs are located within the 50 km cumulative radius and have been considered., three additional REFS, apart from the aforementioned REFS will be considered.

The construction and operation of the Boshoek Solar 1 is still expected to have a limited to very limited contribution to the cumulative impacts of the area and still will not:

- compromise the ecological functioning of the larger "natural" environment; and
- disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

The combined, cumulative footprint of all renewable energy projects (located within the 50 km radius) will increase from around 4407.6 ha, to approximately 5274.4 ha (increase of 866.8 ha) covering only 0.6 % of the area within the 50 km radius (increase of only 0.1%). Of the 5274.4 ha, Boshoek Solar 1 SEF will contribute approximately 6.5 % (343.1 ha). The contribution of the Boshoek Solar 1 SEF, to the loss of natural/near-natural to moderately modified vegetation within the 50 km radius is even smaller as most of the project site is located within already transformed and degraded areas.

In terms of the cumulative impact on the Zeerust Thornveld Vegetation Type, the bulk of the cumulative footprint located within the Zeerust Thornveld Vegetation Type, with very small insignificant amounts extending into Gold Reef Mountain Bushveld (286.8 ha or 5.4% of combined footprint) and Dwaalboom Thornveld (885.8 ha or 16%). Thus, the remaining 4102 ha (78 %) will be located within the Zeerust Thornveld Vegetation Type. For an impact on vegetation types and ecosystems one will have to look beyond the 50 km radius, at all of the REFs located completely or partially within this ecosystem/vegetation type. The combined footprint of all the REFs located within the Zeerust Thornveld Vegetation Type will be approximately 5828 ha and will impact only 1.4 % of the total extent of the mentioned vegetation type (thus the inclusion of the new additional sites within the latest REFA data base will only contribute to a 0.2% increase in cumulative footprint within the Zeerust Thornveld Vegetation Type). The contribution of the Boshoek Solar 1 SEF itself will be very small to insignificant and thus the cumulative impact of the REFs on the affected vegetation type will be insignificant and will not impact or threaten the conservation targets as well as Red List status of this vegetation type.

The cumulative loss and transformation of intact habitats pose a significant threat to the status and ecological functioning of provincially identified Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), thereby affecting the biodiversity conservation targets outlined by the North West Province. Within a 50 km radius, five out of seven Renewable Energy Facilities (REFs) are situated almost entirely within ESA 1 (natural) and/or ESA 2 (unnatural), which aids crucial corridors and nodes for wildlife movement. Among these REFs, only two PV facilities namely the Boshoek PV 2 SEF and the 65 MW Rhino SEF is located entirely within a CBA2 Corridor Node.

Regarding ecosystem functions and services, particularly landscape connectivity, the three Boshoek PV SEFs including the Rhino Solar, Onderstepoort Solar 1 and Onderstepoort Solar 2 SEFs are expected to exert a cumulative impact due to their close proximity to one another and their adjacency to identified corridor nodes and linkages (CBAs). Although all SEFs apart from Boshoek Solar 2 are positioned within ecological support areas that connects three Corridor Nodes and a Critical Corridor Linkage, their current contribution to landscape connectivity is minimal. This is primarily due to extensive habitat transformation and degradation on these properties, which are extensively used for intensive game breeding activities. These properties are divided into small game breeding camps enclosed by highly secure, electrified game fences, which are rigorously monitored, severely constraining natural movement across the area.

Furthermore, the surrounding areas of these properties are characterised by a prominent trafficked road network, further impeding connectivity within the region.

- The addition of the three "new" facilities, will not result in any additional cumulative impacts.
- The addition of the three "new" facilities, will not result in a significant increase in the cumulative impacts that have been described and assessed within the initial study and impact assessment.
- The cumulative impacts that have been assessed within the initial study and impact assessment have all been assessed as being of low significance and remain subsequently as of low significance even with the addition of the three "new" REFs.
- The following conclusions and recommendations that have provided within the initial study and impact assessment still remain true and unchanged.
- These renewable energy facilities (REFs) will impact a very small area within the 50 km radius and will subsequently result in minimal transformation of intact habitats. Subsequently, the cumulative threat posed by these developments on the ecological functioning of these habitats are very small to insignificant, and it is unlikely that these REFS will result in significant habitat fragmentation, disruption of landscape connectivity, and impair the ability of these habitat types to respond to environmental fluctuations.
- The proposed REFs will not threaten the conservation status and targets of set out for national or provincially identified conservation features.
- Excessive clearing of vegetation can, and will, influence runoff and stormwater flow patterns and dynamics, which could cause excessive accelerated erosion of plains, and this could also have detrimental effects on downslope areas.
- Rehabilitation and revegetation of all surfaces disturbed or altered during construction is desirable.
- Runoff from sealed surfaces, or surfaces that need to be kept clear of vegetation to facilitate operation of a development, must be monitored regularly to ensure that erosion control and stormwater management measures are adequate to prevent the degradation of the surrounding environment.
- Large-scale disturbance of indigenous vegetation creates a major opportunity for the establishment of invasive species and the uncontrolled spread of alien invasives into adjacent agricultural land and rangelands.
- A regular monitoring and eradication protocol must be part of all the developments' long-term management plans.
- Excessive clearing of vegetation can and will influence runoff and stormwater flow patterns and dynamics, which could cause excessive accelerated erosion of plains and intermittent drainage lines, and this could also have detrimental effects on the lower-lying areas.
- Rehabilitation and revegetation of all surfaces disturbed or altered during the operational phase are desirable.
- Disturbance of indigenous vegetation creates a major opportunity for the establishment of invasive species and the uncontrolled spread of alien invasives into adjacent rangelands.
- A regular monitoring and eradication protocol must be part of all the developments' long-term management plans.

- After decommissioning, a continuous vegetation layer will be the most important aspect of ecosystem functionality within and beyond the project site.
- A weakened or absent vegetation layer not only exposes the soil surface; but, lacks the binding and absorption capacity that creates the buffering functionality of vegetation to prevent or lessen erosion as a result of floods.

11.4 AVIFAUNA

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

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

To spatially quantify the cumulative effects of the proposed development, the PAOI is compared with the overall effects of surrounding development (including total transformation, and transformation as a result of new and proposed developments of a similar type, i.e., solar). Note that this spatial assessment is only conducted for the proposed solar development footprint area, the powerline area is omitted.

The total area within the 30 km buffer around the PV development area amounts to 344,742 ha, but when considering the transformation (84,838 ha) that has taken place within this radius, 259,904 ha of intact habitat remains according to the 2021 National Biodiversity Assessment. Therefore, the area within 30 km of the project has experienced approximately 24.61% loss in natural habitat. No similar projects exist within the 30 km region (as per the latest South African Renewable Energy EIA Application Database). The total amount of remaining habitat lost as a result of the solar project amounts to 0.352% (PV developments as a percentage of the total remaining habitat).

Below are several mitigation measures to reduce residual risk or enhance opportunities:

- Diverters must be placed along the whole route;
- All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution;
- The areas to be developed must be specifically demarcated to prevent movement into surrounding environments; and
- Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, must under no circumstances be fragmented or disturbed further.

11.4.1 ADDENDUM TO THE CUMULATIVE IMPACT FOR AVIFAUNA

Refer to Figure 11-1 for a map illustrating the amount of remaining natural habitat within a 30 km radius of the proposed project.

The expected cumulative impact of PV development as a whole is expected to be of a 'Low' significance, since the proposed development will result in a further 0.737% loss of the current remnant habitat.

FIGURE 11-1 MAP OF THE REMAINING NATURAL VEGETATION AND APPROVED PV PROJECTS WITHIN THE PAOI REGION

Impact Phase: Cumulative							
Potential impact description: PV cluster development, leading to habitat loss, collisions and electrocutions							
	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
With Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
Can the impact be reversed?			Yes, but only partially as habitat will be lost and likely collisions and electrocutions would still persist.				
Will impact cause irreplaceable loss or resources?			Yes, but only partially as habitat will be lost and likely collisions and electrocutions would still persist.				
Can impact be avoided, managed or mitigated?			Yes, with appropriate mitigations, dust can be reduced				
Mitigation measures to reduce residual risk or enhance opportunities: Diverters must be placed along the whole route; All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution The areas to be developed must be specifically demarcated to prevent movement into surrounding environments.							

Impact Phase: Cumulative
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, must under no circumstances be fragmented or disturbed further.

Residual impact	Yes, but acceptable negative impact

11.5 HERITAGE, ARCHAEOLOGY AND PALEONTOLOGY

There are currently two (in process / approved) Renewable Energy Facilities within 50 km of the Boshoek solar PV cluster based on the data using the REEA_OR_2022_Q4. The cumulative impacts on archaeological heritage are considered MEDIUM before mitigation and LOW after mitigation and, therefore, fall within the acceptable limits for the project.

Cumulative Phase

Damage/destruction to archaeological heritage.

No heritage resources were located, therefore the only potential Impact, are to chance finds.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Can the impact be reversed?			No. Destruction to heritage sites is permeant.				
Will impact cause irreplaceable loss or resources?			Yes. Heritage sites are unique and irreplicable.				
Can impact be avoided, managed or mitigated?			Yes. Follow mitigation measures as described by SAHRA.				

Mitigation measures to reduce residual risk or enhance opportunities:
- Chance find protocol must be implemented

Residual impact	Loss of Fossil Heritage.

Cumulative Phase

Impact on Fossil Heritage.

The excavations and clearing of vegetation during the construction phase of the PV Facility and associated infrastructure areas will consist of digging into the superficial sediment cover as well as underlying deeper bedrock. These excavations will change the existing topography and may possibly destroy or even permanently close-in fossils at or below the ground surface. These fossils will then be lost for research. Impacts on Palaeontological Heritage are only likely to happen within the construction phase. No impacts are expected to occur during the operation phase or decommissioning phase.

	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation / Enhancement	Medium	Low	High	Negative	High	Low	High

Cumulative Phase							
With Mitigation / Enhancement	Medium	Low	High	Neutral	Low	Low	High
Can the impact be reversed?			No. Destroyed fossils cannot be replaced.				
Will impact cause irreplaceable loss or resources?			Yes. Fossils cannot be replaced.				
Can impact be avoided, managed or mitigated?			Yes. The impact can be mitigated by the Chance find protocol.				

Mitigation measures to reduce residual risk or enhance opportunities:

- If a chance find is made the person responsible for the find must immediately **stop working** and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately **report** the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within **24 hours** of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.
- Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.
- The site must be secured to protect it from any further damage. **No attempt** should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- If the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO. Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once the Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

Residual impact	Loss of Fossil Heritage.

11.5.1 ADDENDUM TO THE CUMULATIVE IMPACTS FOR HERITAGE, ARCHAEOLOGY AND PALEONTOLOGY

With the latest REEA database release, a statement has been requested to indicate whether the cumulative assessment is affected. Considering the information available from the new REEA database, we do not foresee any changes to the cumulative Impacts on the Boshoek Solar SEF 1 and will not result in a change of impacts and their rating.

11.6 VISUAL AND LANDSCAPE

The cumulative impact of the Project during the operational phase is potentially MEDIUM when the Project site is considered along with the other two Boshoek solar PV facilities and the associated powerline and substation infrastructure. The intervisibility and these components along with the existing power lines would over time, result in the nature and character of the sub-region being impacted in a manner beyond the anticipated moderate (without mitigation) negative impact of the proposed Project alone.

The significance of the cumulative impact of these activities on the visual environment during their operational phase of the Project is assessed to have a medium severity and over the medium-term with an unmitigated sub-regional impact assessed as MEDIUM. The Table below summarises the potential cumulative impact.

	Impact Phase: OPERATIONAL							
	Potential impact description: Visual Impact Change of the landscape characteristics and key views and potential glint and glare							
	Severity	Extent	Duration	Status	Consequence	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	MEDIUM	Medium
With Mitigation	Low	Medium	Low	Negative	Low	Low	LOW	Medium
Can the impact be reversed?	YES – by removing the infrastructure and rehabilitating the disturbed areas – existing elements (ESKOM powerline) would most likely remain							
Will impact cause irreplaceable loss or resources?	No – but there will be a loss during all phases of the project. However, the Project sites can be rehabilitated post-closure.							
Can impact be avoided, managed, or mitigated?	NO but can be managed at night by managing the light design and placement and maintaining/establishing tree screens along the site's boundaries, where required, with adjacent public roads.							
Residual impact	*Yes, but would reduce once solar PVs and associated power distribution infrastructure is removed and the residual impact would revert back to the current cumulative infrastructure consisting of transmission lines.*							

11.6.1 ADDENDUM TO THE CUMULATIVE IMPACT FOR VISUAL AND LANDSCAPE

The cumulative impact during the construction phase is likely to remain medium (relative to the original cumulative impact), however, this would be dependent on the timing of each of the separate projects. If all projects are scheduled to occur at the same time the anticipated cumulative visual impact during the construction phase would be high, due to the major disruption of the landscape characteristics. However, should the construction programme be staggered, the various project sites would be able to recover, and the proposed tree screens would become effective, thus reducing the cumulative impact to medium.

During the operational phase the predicted cumulative visual impact would remain medium, assuming that the management measures, including the establishment of strategically located tree screens, have been effective implemented and managed in the long term.

11.7 SOCIO-ECONOMIC

The Boshoek 1 Solar Facility alone has a limited potential for resulting in significant cumulative impacts in the area as the nearest similar project is ~35 km away. Considered however along with the Boshoek 2, and Boshoek 3 Solar Facility, the Boshoek Cluster will have a more significant positive cumulative impact. The resulting impacts could create several socio-economic opportunities for the area, which in turn, will result in a positive social benefit. The positive cumulative impacts include creation of employment, skills development and training opportunities, and downstream business opportunities. Benefits to the local, regional, and national economy through employment and procurement of services could be substantial should

many renewable energy facilities proceed. This benefit will increase significantly should critical mass be reached that allows local companies to develop the necessary skills to support construction and maintenance activities and that allows for components of the renewable energy facilities to be manufactured in South Africa. Furthermore, at municipal level, the cumulative impact could be positive and could incentivize operation and maintenance companies to centralize and expand their activities towards education and training.

The Boshoek 1 Solar PV Facility, as part of the Boshoek Solar Cluster are the only similar projects in close proximity. The REEA 2024 Q1 project (Marked in purple) is a 15 MW Solar PV Facility that applied for EA in 2012 (Ref: 14/12/16/3/3/1/498). This project could be considered too far to be considered to contribute to the cumulative impact of the Boshoek 1 Solar PV Facility. It is however relevant to consider the Boshoek Cluster as a cumulative impact.

The Boshoek 1 Solar Facility project forms part of a wider growing industry that will alleviate some of the pressures from the energy crisis in South Africa. The project will also add benefits such as skills development and job creation to the area, as well as further contributing to the local economy. Similarly, it would contribute to the negative aspects of development, potentially increasing crime, change in sense of place, visual, dust, and other impacts.

11.7.1 ADDENDUM TO THE CUMULATIVE IMPACT FOR SOCIO-ECONOMIC

New data in the form of the REEA 2024 Q1 Data has been made available after the release of the March 2024 SIA, indicating additional developments in the area. An additional three projects have been identified in close proximity to the Boshoek 1 Solar PV Facility, and Boshoek Solar Cluster Facility.

- 240 MW Onderstepoort Solar 1 Photovoltaic Project (**14/12/16/3/3/2/2320**) – adjacent to the site;
- 240 MW Onderstepoort Solar 2 Photovoltaic Project (**14/12/16/3/3/2/2319**) – adjacent to the site;
- 65 MW Rhino Solar Photovoltaic Project (**14/12/16/3/3/2/2321**) – adjacent to the site; and
- 15MW solar PV Facility (**14/12/16/3/3/1/498**) – within 30km of the site.

The development of the above mentioned solar energy facilities as well as the Boshoek Solar Facility Cluster will result in significant changes to the cumulative impacts as assessed for the Boshoek 1 Solar Facility. The Boshoek 1 Solar Facility, in relation to these developments, will form part of a wider growing industry that will contribute to the alleviation of some of the pressures from the energy crisis in South Africa. Further, these facilities will contribute clean renewable energy to the national grid, which will reduce, in a small way, the reliance on harmful fossil fuels. The project will also provide additional socio-economic benefits such as skills development and job creation to the area. The increase in number of projects would greatly improve the likelihood and extent of these benefits to local communities and to local businesses that would likely benefit in direct and indirect ways to the development.

The development of the identified facilities would contribute to the negative impacts associated with these developments. With the increase in number of developments in the area there is an increased risk in the influx of workers into the area that could have a number of unintended consequences such as the increase in crime and other social ills. Lastly, with the close proximity of these projects to each other, the visual impacts and sense of place would also be heightened.

As such the potential positive and negative cumulative impact tables have been appended. See Tables below.

Impact Phase: Operation							
Potential impact description: An increase in employment opportunities, skills development, and business opportunities with the establishment of additional renewable energy facilities. The establishment of more solar energy facilities in the area has the potential to have a positive cumulative impact on the area in the form of employment opportunities, skills development, and business opportunities.							
	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Medium	High	Positive	Medium	Medium	Medium
With Mitigation	High	Medium	High	Positive	High	High	High
Can the impact be reversed?	Yes, the use of the area can revert to its original state through rehabilitation after the operation of the facility and grid.						
Will impact cause irreplaceable loss of resources?	No, the impacts associated with the project and others like it can be reversed.						
Can impact be avoided, managed, or mitigated?	Yes, steps can be taken to enhance the potential positive impacts of similar projects in the area.						
Mitigation measures to reduce residual risk or enhance opportunities: The positive benefits will be enhanced if local employment policies are adopted, and local services providers are utilised where possible, by the developers to maximise the project opportunities available to the local business and the community.							
Residual impact	None anticipated.						

Impact Phase: Operation							
Potential impact description: An increase in security and safety risks resulting from the influx of job seekers and road activity associated with the construction and operations of similar facilities. The establishment of more solar facilities has the potential to exasperate the negative social impacts associated with the construction and operation of the facility.							
	Severity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	High	Medium	High	Negative	High	High	Medium
With Mitigation	Medium	Low	High	Negative	Medium	Medium	High
Can the impact be reversed?	Yes, the impacts associated with the developments can be reversed.						
Will impact cause irreplaceable loss of resources?	No, the use of the land for solar power will cause minimal loss of resources						
Can impact be avoided, managed, or mitigated?	Yes, steps can be taken to mitigate some of the negative impacts associated with the operation of the facility.						
Mitigation measures to reduce residual risk or enhance opportunities: These impacts can be effectively mitigated through the implementation of good policies and measures.							

Impact Phase: Operation	
Residual impact	None anticipated.

The inclusion of the additional developments is likely to increase the likelihood and severity of both the cumulative positive and negative socio-economic impacts associated with the Boshoek Solar 1 Facility, the Boshoek Solar Cluster, and other identified development. The cumulative affected of the developments indicate a significant change to the nature of the area. It remains the recommendation of the report the affective mitigation and enhancement strategies be followed in order to maximise the socio-economic benefits that the development of the project could offer. Further, the wider environmental and social benefits of reducing the reliance of fossil fuels as a source of energy should also be emphasised.

While the cumulative impacts are increased, it does not constitute a fatal flaw in the proposed development of the Boshoek Solar 1 Facility and is still largely beneficial to local communities and thus supported by this assessment.

11.8 TRAFFIC AND TRANSPORTATION

The Table below shows a list of similar projects within 35 km radius of the Boshoek 1 Solar PV Facility. The cumulative capacity of the nearby Solar Polar Voltaic (PV) sites is 200 MW. It is pointed out that these facilities are within 5 km of the subject site.

TABLE 11-3 SIMILAR DEVELOPMENTS WITHIN 35KM FROM SITE (CUMULATIVE DEVELOPMENT)

#	Project Title	Application Received	Applicant	EAP	Local Mun	Technology	Megawatt	Project Status
1	Proposed Boshoek Solar PV 2	NA	Atlantic Renewable Energy Partners (PTY) Ltd	ERM Southern Africa (Pty) Ltd	Rustenberg Local Municipality	Solar PV	150	Pre-Submission
2	Proposed Boshoek Solar PV 3	NA	Atlantic Renewable Energy Partners (PTY) Ltd	ERM Southern Africa (Pty) Ltd	Rustenberg Local Municipality	Solar PV	50	Pre-Submission
							200	Total

Assuming that all developments are built simultaneously and to similar project programme the cumulative solar PV Facility sites would generate approximately 252 peak hour light vehicle trips and 13 buses to site per day. These are single directional trips (to site in AM / from site in PM). The 252 peak hour trips are significant.

This can be mitigated by constructing the three Solar PV facilities consecutively, or, assuming all facilities are built simultaneously, by encouraging artisan and specialist staff to travel outside peak hours or by providing at least 3 buses for artisans and specialist staff to the various sites.

Mitigation measures to reduce risk or enhance opportunities:

- Constructing the Solar PV sites concurrently;

- proving traffic road markings on R565 in Boshoek;
- Focused traffic law enforcement on R565 at Boshoek shopping hub particularly during PM peak hours; and
- Plan for light vehicles to/from site to travel outside the traffic peak hours, and / or accommodate most of the specialists and artisans in buses (3 busses equates to 150 vehicles) to/from site.

11.8.1 ADDENDUM TO THE CUMULATIVE IMPACTS FOR TRAFFIC AND TRANSPORTATION

It is likely that the additional facilities will be constructed in phases, which would reduce the cumulative traffic impact. Additionally, development-related traffic could be reduced by providing bus transport to the site or accommodating workers on-site. The TIA should be based on accurate cumulative development data and would include recommendations for necessary road upgrades and improvements. Therefore, the cumulative assessment mitigation measures and recommendations provided in the original Traffic Impact Assessment remain unchanged and applicable in light of the latest REA data.

12. SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

12.1 SOIL, LAND USE AND AGRICULTURAL POTENTIAL

The overall conclusion of this assessment is that the proposed development is acceptable because it can provide benefits to agriculture but leads to no loss of potential cropland and therefore minimal loss of future agricultural production potential.

The farm is in an area where only grazing (game and boerbokke) and limited irrigation are practised. Satellite imagery shows no rain-fed cropping in the area, only lands where bush is cleared to improve grazing. The climate is classified as arid and therefore limiting to rain-fed cropping. The mean annual rainfall versus evaporation and the seasonal distribution of rainfall in the area means that there is an insufficient moisture reservoir to carry a crop through the season. Some irrigation is practised in the area on sites closer to the river, but the amount of irrigation water is very limited. There has never been irrigation on the particular farm. The agricultural potential of the site is therefore limited, predominantly by climate, to being suitable only as grazing land.

An agricultural impact is a change to the future agricultural production potential of land. This is primarily caused by the exclusion of agriculture from the footprint of a development. In this case, the entire proposed PV area is considered to be below the threshold for needing to be conserved as agricultural production land because of the limitations on its cropping potential. The production potential of the land is limited to only being suitable as grazing land, and there is no particular scarcity of such land in the country, in contrast to arable land, which is very scarce. The use of this land for solar power generation will cause minimal loss of agricultural production potential in terms of national food security.

Furthermore, the land occupied by PV panels can be used for the dual purposes of solar power generation and agricultural food production by way of sheep grazing. This has potential benefits for both activities and means that the land remains agriculturally productive. The benefit for sheep farming is that the security infrastructure of the solar facility will protect the sheep within

it against stock theft. The benefit for the solar facility is that the sheep will control the height of the vegetation below the solar panels thus reducing the need to mechanically control the height of vegetation.

At the farm level, the development will provide a positive economic impact. This is likely to increase cash flow and financial security and may improve farming operations and productivity on other parts of the farm or properties owned by the same farmer, through increased investment into farming.

Due to the facts that the energy facility will not occupy scarce, viable cropland and that its negative impact is offset by economic benefits to farming, the overall negative agricultural impact of the development (loss of future agricultural production potential) is assessed here as being of low significance and as acceptable.

With regards to the agricultural impacts of the proposed overhead power line, it will result in negligible loss of future agricultural production potential and its agricultural impact is therefore assessed as being of very low significance.

The development's acceptability is further substantiated by the following points:

- The proposed development will also have the wider societal benefits of generating additional income and employment in the local economy;
- In addition, the proposed development will contribute to the country's urgent need for energy generation, particularly renewable energy that has much lower environmental and agricultural impact than existing, coal powered energy generation; and
- All renewable energy development in South Africa decreases the need for coal power and thereby contributes to reducing the large agricultural impact that open cast coal mining has on highly productive agricultural land throughout the coal mining areas of the country.

From an agricultural impact point of view, it is recommended that the proposed development be approved. The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any other conditions other than recommended mitigation.

12.2 FRESHWATER AND WETLANDS (AQUATICS)

In summary, the report's findings indicate that various watercourses and drainage lines within the study area exhibit different levels of modification, influenced by a range of natural and anthropogenic factors. Understanding these variations in habitat integrity and ecological state is essential for making informed decisions regarding conservation and management strategies for these ecosystems.

Additionally, the assessment underscores the ecological significance and sensitivity of different watercourses, emphasizing the importance of preserving and managing these vital habitats based on their unique characteristics and roles in supporting local ecosystems.

With mitigation measures in place, impacts on surface water resource integrity and functioning can be reduced to a sufficiently low level. This would be best achieved by incorporating the recommended management & mitigation measures into an Environmental Management Programme (EMPr) for the site, together with appropriate rehabilitation guidelines and ecological monitoring recommendations.

Based on the outcomes of this study it is the specialist's considered opinion that the proposed project detailed in the Aquatic Assessment Report could be authorised from a surface water resource perspective.

12.3 TERRESTRIAL BIODIVERSITY (FLORA AND FAUNA)

As part of this Assessment detailed field surveys were undertaken over the course of 27th to the 29th of March 2023 (early autumn) and 23rd to 24th of January (summer). During the site visits the vegetation was in optimal survey conditions; and the majority of plants were easily identifiable. The outcome of this report is a terrestrial ecological importance and sensitivity map visually illustrating the findings and results which will then aid in the final planning and design phase of the Boshoek Solar 1 Solar Facility, with the purpose of avoiding any sensitive areas and/or detrimental impacts on the environment.

Habitat sensitivity classification was based on available GIS coverages including various terrestrial ecosystems and biodiversity data, a recent screening survey, and the expert's mapping from Google Earth satellite imagery (altitude 1 to 2 km).

The affected properties are almost entirely used for game ranching with very limited infrastructure, mainly restricted to access roads, bomas, kraals, water and feeding points for game and livestock, and the occasional homestead. Land-use within the surrounding properties is also similarly and predominantly utilized for game ranching.

Livestock farming was historically the main land use practice within the area, with varying stocking rates and grazing regimes implemented. It however appears that the farms were historically fairly small and utilized as grazing for predominantly cattle and occasionally a mixture between cattle and sheep. Stocking rates appears to have varied between moderate to high rates with continuous grazing to rotational grazing systems utilized, with the exclusion of fire (natural or as a management tool). This has likely resulted in the current overgrazed and transformed situation observed on certain properties, with bare, exposed soils locally present and subjected to soil capping and sheet erosion. These historical management practices have also resulted in the encroachment of small to shrubby, thorny bushes, which have been occasionally cleared and thinned out over the last 30 – 50 years (these management practices are present within almost all the properties). However, since the transition to game breeding, large areas have been subjected to significant modifications, with the areas being cordoned off in small game breeding camps, with large scale bush clearing and in some areas the ripping, tilling and planting of palatable grasses such as *Cenchrus ciliaris*, *Urochloa mosambicensis*, *Digitaria argyrograpta* and *Dichanthium annulatum*. These areas should rather be regarded as pastures than natural grazing lands.

The proposed development won't have any impact on any protected- and/or conservation areas. Subsequently, the development is regarded, in terms of this systematic planning framework, as acceptable. Additionally, it is highly unlikely that the proposed development will have a significant impact on potential SCC species and their regional populations, as large tracts of natural habitat will still persist outside of the development site.

There are no impacts associated with the proposed Boshoek Solar PV 1 development that cannot be mitigated to a low level. Its local environmental impact can be reduced to an acceptable magnitude. Likewise, the contribution of the proposed Solar PV facility to the cumulative impact in the area would be low and is acceptable. As such, there are no fatal flaws associated with the development and no terrestrial ecological considerations that should prevent it from proceeding.

Therefore, it is the opinion of the specialists that the development may be authorised within the specified area, subject to the implementation of the recommended mitigation measures.

Appropriate buffer must be established around highly sensitive habitats (i.e., Watercourses). Additionally very highly sensitive habitats near the development footprint must be avoided or demarcated as no-go area.

12.4 AVIFAUNA

This Avifauna Impact Assessment aimed to provide information to guide the risk of the proposed Solar PV project and the associated infrastructure to the Avifauna community likely affected by its development. Two site visits were conducted for this regime 2 assessment in winter over the 9-11th of June 2023 and in spring over the 16-17th of September. These site visits are considered sufficient from a seasonal perspective and require no additional season assessment. However, the data was compared to the SABAP dataset and no differences were observed, further suggesting that sufficient data sampling was conducted to better our understanding of the bird community in the area.

Sampling consisted of Standardised Point Counts as well as random diurnal incidental surveys. The total number of individual species accounts for approximately 35% of the total number of expected species. Only one SCC was recorded in the field investigation (Secretarybird) and eleven priority species.

The SEI of the proposed PAOI was found to be low to medium but predominantly medium. However, the sensitivity can be assumed to be low. Impacts were identified as being High to Medium in the Construction Phase, most of which could be reduced to Medium or Low with mitigation measures described in the report. Impacts in the operational phase are expected to be Medium and can be reduced to Medium or Low with mitigation measures described in the report. Decommissioning phase impacts are expected to be Medium and can be reduced to Low with mitigation measures. Cumulative impacts are Low for the project in isolation and Medium in consideration with other similar projects.

Management measures include ensuring the construction footprint is kept small and industry-standard mitigations are put into place for solar panels, fencing and electrical infrastructure, among other measures. All project aspects can be effectively mitigated to an acceptable residual impact in support of the renewable development project.

12.5 HERITAGE, ARCHAEOLOGY AND PALEONTOLOGY

No heritage resources were located, however, not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and existing vegetation cover. It should be noted most of the study area was accessible for the fieldwork survey, but the vegetation is thick bush and visibility of sites such as Stone Age or Iron Age are difficult to locate.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented:

- A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts during the implementation of the EMPr.
- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.

It is the combined considered opinion of the heritage specialists that the proposed project will not have a direct impact on heritage resources.

With the implementation of recommended mitigation measures the overall impact on heritage resources will be at an acceptable level during the activities of the project.

12.6 VISUAL AND LANDSCAPE

The existing visual condition of the landscape that may be affected by the proposed Boshoek Solar 1 Project and associated OHPL infrastructure has been described. The study area's scenic quality has been rated moderate to high within the context of the sub-region. Sensitive viewing areas have been identified and mapped, indicating potential moderate to high sensitivity to the Project, mainly for nearby tourist accommodation and adjacent roads.

Impacts on views are the highest when viewers are sensitive to change in the landscape, and the view is focused on and dominated by the change. The Project's visual impact will cause changes in the landscape that are noticeable to people viewing the landscape from nearby farmsteads/game farms and along the east west arterial road and local farm roads. The potential impact ratings are based on the worst-case scenario and when the impacts of all aspects of the Project are taken together. It is anticipated that visual impacts could result from the activities and infrastructure in all the Project phases i.e. construction, operational, and decommissioning, however, due to the screening effect and the relatively high VAC of the bushveld vegetation, the potential for high visual impacts is limited. There is also the possibility of glint and glare that would affect road users of the adjacent public roads.

The worst-case impact on the visual environment during the construction phase is assessed to have a moderate severity over a localized area (but extend beyond the site boundary) and would occur over the short-term (less than the life of the project). The probability of the unmitigated impact is medium, resulting in a predicted MEDIUM significance of negative impact. The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain MEDIUM.

The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain MEDIUM.

The worst-case impact on the visual environment during the operational phase is assessed to have a medium severity over a localized area (but extend beyond the site boundary) and would occur over the medium terms (reversible over the life of the project). The probability of the

unmitigated impact is medium resulting in a MODERATE predicted significance negative impact. A moderate impact implies a noticeable impact with unavoidable consequence, which will need to be accepted if the project is allowed to proceed.

Mitigation measures are feasible and can reduce the visual impact over time (once the proposed tree screens, where required, are established). The impact with mitigation is predicted to be LOW.

Decommissioning and closure activities include the dismantling and removal of infrastructure and the rehabilitation of the site back to its current, mostly natural, state.

The worst-case impact on the visual environment during the construction phase is assessed to have a medium severity over a localized area (but extend beyond the site boundary) and would occur over the short-term (less than the life of the project). The probability of the unmitigated impact is medium, resulting in a predicted LOW significance of negative impact. The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain LOW.

The significance of the cumulative impact of the Boshoek Solar PV Cluster on the visual environment during their operational phase of the Project is assessed to have a medium intensity and over the medium-term with an unmitigated sub-regional impact assessed as MEDIUM.

12.7 SOCIO-ECONOMIC

From a social perspective, it is concluded that the proposed project and its associated infrastructure is supported, but that mitigation measures should be implemented and adhered to. Positive and negative social impacts have been identified. The assessment of the key issues indicated that there are no negative impacts that can be classified as fatal flaws, and which are of such significance that they cannot be successfully mitigated. Positive impacts could be enhanced by implementing appropriate enhancement measures and through careful planning. Based on the social assessment, the following general conclusions and findings can be made:

The potential negative social impacts associated with the construction phase are typical of construction related projects and not just focused on the construction of PV facilities (these relate to influx of non-local workforce and jobseekers, intrusion and disturbance impacts, safety, and security) and could be reduced with the implementation of the mitigation measures proposed;

Employment opportunities will be created in the construction and operation phase and the impact is rated as positive even if only a small number of individuals benefit in this regard;

The proposed project could assist the local economy to a small extent in creating entrepreneurial development, especially if local business could be involved in the provision of general materials and services during the construction and operational phases;

Capacity building and skills training among employees is critical and would be highly beneficial to those involved, especially if they receive portable skills to enable them to also find work elsewhere and in other sectors; and

The proposed development also represents an investment in infrastructure for the generation of clean, renewable energy, which, given the challenges created by climate change, represents a positive social benefit for society as a whole.

The proposed Boshoek Solar 1 is unlikely to result in permanent damaging social impacts. Boshoek Solar 1 has the potential to result in significant positive cumulative impacts, specifically as the Boshoek Cluster will create socio-economic opportunities for the region, which in turn,

can result in positive social benefits. The positive cumulative impacts include the creation of employment, skills development and training opportunities, and downstream business opportunities. The cumulative benefits to the local and regional economy through employment and procurement of services are more considerable than that of the Boshoek Solar 1 alone. From a social perspective, it is concluded that the proposed project and associated infrastructure are acceptable and should be developed subject to the implementation of the recommended mitigation measures and management actions contained in this report.

12.8 TRAFFIC AND TRANSPORTATION

The proposed Boshoek 1 Solar PV facility is expected to be built over a period of 16 months and could generate significant traffic volumes on the road network.

A Traffic Impact Assessment and a Traffic Management Plan are required to address possible issues on the R565 in Boshoek at the OK Grocer shopping hub, and on-site pedestrian safety. A few abnormal load vehicles transporting heavy machinery will operate under permit obtained by the transport carrier. The R565/D114 intersection requires road markings and signage to improve readability by motorists and to avoid unnecessary crashes.

The site access road approach to D114 should be hardened for 30 m to reduce material carry onto the D114. The increased traffic/construction traffic at the D114/site access road intersection could lead to vehicle crashes, and advance warning “truck crossing” signage should be erected on the D114 approaches. The increased traffic/construction traffic at the site access could lead to vehicle crashes, and advance warning “truck crossing” signage should be erected on the gravel site access road approaches to the site access.

Increased vehicles or construction vehicles on the gravel site access road could lead to deterioration of the road pavement, and this requires monitoring and regular road maintenance.

Increased traffic on the site access road could lead in increased dust, with reduced forward visibility and higher risk of vehicle crashes, and construction vehicles travel speeds should be reduced to 50km/h reduce dust.

High number of pedestrians with light vehicles, buses and heavy and delivery vehicles on-site carries increased potential for serious pedestrian/vehicles crashes. This can be mitigated by separating delivery/construction vehicles from buses and light vehicles in a well-designed parking area with clear vehicle/pedestrian paths separation.

The facility will have a low trip generation over the 25 years operations phase and no impacts are identified for this phase.

The increased traffic or construction traffic at the D114/site access road intersection could lead to vehicle crashes, and advance warning “truck crossing” signage should be erected on the D114 approaches to the site access road. Increased traffic/construction traffic at the site access could lead to vehicle crashes, and advance warning “truck crossing” signage should be erected on the gravel site access road approaches to the site access.

During the 2 months decommissioning phase increased number of heavy vehicles on the gravel site access road could lead to deterioration of the pavement, which increases risk of crashes. The condition of the site access road should be monitored and maintained to a good standard.

Increased traffic on the site access road increases dust which creates forward visibility issues for motorists and increases risk of crashes. This can be mitigated by implementing a 50 km/h speed

restriction for heavy vehicles on the gravel site access road, with possible dust suppressant if really needed.

High number of pedestrians with light vehicles, buses and heavy and delivery vehicles on-site carries increased potential for serious pedestrian/vehicles crashes. This can be mitigated by separating delivery/construction vehicles from buses and light vehicles in a well-designed parking area with clear vehicle/pedestrian paths separation.

The cumulative traffic impact of planned construction of various Solar PV facilities within 35 km (within 5 km from the site) could coincide with the Boshoek Solar PV 1 facility. The cumulative traffic is significant and could increase traffic congestion on the R565 at the OK Grocer shopping centre hub. This could be mitigated by development related light vehicles travelling outside peak hours and/or providing bus transport for the majority of artisans and specialists.

12.9 SUMMARY FINDINGS OF ALL SPECIALIST STUDIES

CONSTRUCTION PHASE IMPACTS

Construction Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Freshwater and Wetlands								
Impact on freshwater resource systems through the increase in surface runoff on form and function	Without Mitigation	Medium	Medium	Medium	Negative	High	Medium	High
	With Mitigation	Low	Medium	Low	Neutral	Medium	Medium	High
Increase in sedimentation and erosion	Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	High
	With Mitigation	Low	Low	Low	Negative	Low	Low	High
Potential impact on localised surface water quality	Without Mitigation	Medium	Medium	Low	Negative	Low	Low	High
	With Mitigation	Low	Low	Low	Negative	Low	Low	High
Loss of freshwater resource features during the construction	Without Mitigation	High	Medium	Medium	Negative	High	Medium	High
	With Mitigation	Low	Medium	Low	Negative	Low	Low	High
Terrestrial Biodiversity								
Potential impacts on plant biodiversity and habitats	Without Mitigation	Medium	Low	High	Negative	High	Medium	High
	With Mitigation	Medium	Low	Medium	Negative	Medium	Medium	High
Impact on Faunal Diversity	Without Mitigation	Low	Low	Medium	Negative	High	Medium	High

Construction Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
	With Mitigation	Low	Low	Medium	Negative	Medium	Medium	High
Potential impacts on Animal Species of Conservation Concern (SCC)	Without Mitigation	High	Low	High	Negative	Low	Medium	High
	With Mitigation	High	Low	Medium	Negative	Low	Low	High
Soil erosion and associated degradation of ecosystems	Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
	With Mitigation	Low	Low	Low	Negative	Medium	Medium	High
Avifauna								
Destruction, further loss and fragmentation of the habitats, ecosystems and vegetation community, including protected species	Without Mitigation	Medium	Medium	Medium	Negative	Medium	High	Medium
	With Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
Spread and/or establishment of alien and/or invasive species	Without Mitigation	Medium	Medium	Medium	Negative	Medium	High	Medium
	With Mitigation	Low	Medium	Medium	Negative	Medium	Medium	Medium
Displacement of avifaunal community due to habitat loss, direct mortalities and disturbance	Without Mitigation	Medium	Medium	Medium	Negative	Medium	High	Medium
	With Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
Dust generation from construction activities	Without Mitigation	Low	Medium	Medium	Negative	Low	Low	Medium
	With Mitigation	Low	Low	Low	Negative	Low	Low	Low
Heritage and Paleontology								

Construction Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Impact on Fossil Heritage	Without Mitigation	Medium	Low	High	Negative	High	Low	High
	With Mitigation	Medium	Low	High	Neutral	Low	Low	High
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Visual/Landscape								
Change of the landscape characteristics and key views i.e. visual intrusion	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
	With Mitigation	Medium	Medium	Low	Negative	Medium	Medim	Medium
Socio-economic								
Employment opportunities and skills development	Without Mitigation	Low	Medium	Low	Positive	Medium	Low	Medium
	With Mitigation	Medium	Medium	Low	Positive	Medium	Medium	Medium
Multiplier effects on the local economy	Without Mitigation	Low	Medium	Low	Positive	Medium	Low	Medium
	With Mitigation	Medium	Medium	Low	Positive	Medium	Medium	Medium
Influx of Jobseekers and change of population	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Medium	Low	Medium

Construction Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Safety and security	Without Mitigation	Medium	Medium	Low	Negative	Medium	Low	Medium
	With Mitigation	Low	Low	Low	Negative	Low	Low	Medium
Increased pressure on local services/resources	Without Mitigation	Medium	Medium	Low	Negative	Medium	Low	Medium
	With Mitigation	Low	Low	Low	Negative	Low	Low	Medium
Disruption of daily living and movement patterns	Without Mitigation	Medium	Medium	Low	Negative	High	Low	Medium
	With Mitigation	Low	Low	Low	Negative	Medium	Low	High
Nuisance impacts (noise & dust)	Without Mitigation	Medium	Medium	Low	Negative	High	Low	Medium
	With Mitigation	Low	Low	Low	Negative	Medium	Low	High
Impacts associated with the loss of agricultural land	Without Mitigation	Medium	Medium	Low	Negative	High	Low	Medium
	With Mitigation	Low	Low	Low	Negative	Medium	Low	High
Traffic and Transportation								
Traffic congestion	Without Mitigation	Medium	Medium	Low	Negative	High	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Medium	Medium	Medium
Road safety at DR114/R565 intersection	Without Mitigation	High	Medium	Low	Negative	High	Medium	High
	With Mitigation	High	Medium	Low	Positive	Low	Low	High
	Without Mitigation	High	Medium	Low	Negative	Medium	Medium	Medium

Construction Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Road safety at DR114/Site access road intersection	*With Mitigation*	High	Medium	Low	Negative	Low	Low	Medium
Road safety at site access	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium
Degradation of gravel site access road	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	High
	With Mitigation	Medium	Medium	Low	Negative	Low	Low	High
Dust on gravel site access road	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	High
	With Mitigation	Medium	Medium	Low	Negative	Low	Low	High
Pedestrian safety on-site	Without Mitigation	High	Low	Low	Negative	High	Medium	Medium
	With Mitigation	High	Low	Low	Negative	Low	Low	High

OPERATIONS PHASE IMPACTS

Operational Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Freshwater and Wetlands								
Impact on freshwater resource systems through the increase in	Without Mitigation	Medium	Medium	Medium	Negative	High	Medium	High
	With Mitigation	Low	Medium	Low	Neutral	Medium	Medium	High

Operational Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
surface runoff on form and function								
Increase in sedimentation and erosion	Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	High
	With Mitigation	Low	Low	Low	Negative	Low	Low	High
Terrestrial Biodiversity								
Alien Plant Invasion	Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
	With Mitigation	Low	Low	Low	Negative	Medium	Medium	High
Direct Faunal Impacts	Without Mitigation	Low	Low	Medium	Negative	Medium	Medium	High
	With Mitigation	Low	Low	Low	Negative	Low	Low	High
Soil erosion and associated degradation of ecosystems	Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
	With Mitigation	Low	Low	Low	Negative	Low	Low	High
Alien Plant Invasion	Without Mitigation	Medium	Medium	High	Negative	Medium	High	High
	With Mitigation	Low	Low	Low	Negative	Low	Low	High
Avifauna								
Continued fragmentation and degradation of	Without Mitigation	Medium	Medium	Medium	Negative	Medium	High	Medium
	With Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium

Operational Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
habitats and ecosystems								
Spread of alien and/or invasive species	Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
	With Mitigation	Low	Low	Low	Negative	Low	Low	Low
Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance	Without Mitigation	High	Medium	Medium	Negative	Medium	Medium	Medium
	With Mitigation	Medium	Low	Low	Negative	Low	Low	Low
Heritage and Paleontology								
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Impact on Fossil Heritage	Without Mitigation	Medium	Low	High	Negative	High	Low	High
	With Mitigation	Medium	Low	High	Neutral	Low	Low	High
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Visual/Landscape								
Visual Impact	Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium

Operational Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
	With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium
Socio-economic								
Direct Employment and skills development during operation	Without Mitigation	Low	Medium	High	Positive	Medium	Low	Medium
	With Mitigation	Medium	Medium	High	Positive	High	Low	High
Development of clean, renewable energy infrastructure	Without Mitigation	Medium	Medium	High	Positive	High	Low	High
	With Mitigation	Medium	Medium	High	Positive	High	Low	High
Visual impacts and impacts on sense of place	Without Mitigation	Medium	Medium	High	Negative	High	Medium	Medium
	With Mitigation	Low	Low	High	Negative	Medium	Low	High
Benefits associated with socio-economic contributions	Without Mitigation	Medium	Medium	High	Positive	High	Low	High
	With Mitigation	Medium	Medium	High	Positive	High	Low	High
Impacts associated with the loss of agricultural land	Without Mitigation	Medium	Medium	High	Negative	High	Low	Medium
	With Mitigation	Low	Low	High	Negative	Medium	Low	High
Traffic and Transportation								
Road safety at site access	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium

DECOMMISSIONING PHASE IMPACTS

Decommissioning Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Freshwater and Wetlands								
Compromise ecological processes as well as ecological functioning of important freshwater resource habitats	Without Mitigation	Medium	Medium	High	Negative	High	High	High
	With Mitigation	Low	Medium	Medium	Negative	Low	Low	High
Heritage and Paleontology								
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Impact on Fossil Heritage	Without Mitigation	Medium	Low	High	Negative	High	Low	High
	With Mitigation	Medium	Low	High	Neutral	Low	Low	High
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Visual/Landscape								
Visual Impact	Without Mitigation	Low	Medium	Low	Negative	Low	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Low	Medim	Medium
Traffic and Transportation								
Road safety at site access	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium

Decommissioning Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
	With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium
Degradation of gravel site access road	Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
	With Mitigation	Medium	Medium	Low	Negative	Low	Low	Medium
Dust on gravel site access road	Without Mitigation	High	Low	Low	Negative	Medium	Medium	Medium
	With Mitigation	Low	Low	Low	Negative	Low	Low	Medium
Pedestrian safety on site	Without Mitigation	High	Low	Low	Negative	Medium	Medium	Medium
	With Mitigation	Medium	Low	Low	Negative	Low	Low	Medium

CUMULATIVE PHASE IMPACTS

Cumulative Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Freshwater and Wetlands								
Compromise ecological processes as well as ecological functioning of important freshwater resource habitats	Without Mitigation	Medium	Medium	High	Negative	High	High	High
	With Mitigation	Low	Medium	Medium	Negative	Low	Low	High
Terrestrial Biodiversity								
Impact on Critical Biodiversity Areas and broad-scale ecological processes	Without Mitigation	Low	High	Medium	Negative	Low	Low	High
	With Mitigation	Low	High	Medium	Negative	Low	Low	High

Cumulative Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Impact on Critical Biodiversity Areas and broad-scale ecological processes	Without Mitigation	Low	High	Medium	Negative	Low	Low	High
	With Mitigation	Low	High	Medium	Negative	Low	Low	High
Avifauna								
PV cluster development, leading to habitat loss, collisions and electrocutions	Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
	With Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
Heritage and Paleontology								
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Impact on Fossil Heritage	Without Mitigation	Medium	Low	High	Negative	High	Low	High
	With Mitigation	Medium	Low	High	Neutral	Low	Low	High
Damage/destruction to archaeological heritage	Without Mitigation	Low	Low	Low	Neutral	Low	Low	High
	With Mitigation	Low	Low	Low	Neutral	Low	Low	High
Visual/Landscape								
Visual Impact	Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Low	Low	Low

Cumulative Phase		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Socio-Economic								
An increase in employment opportunities, skills development, and business opportunities with the establishment of more than one solar energy facility	Without Mitigation	Medium	Medium	High	Positive	Medium	Low	Medium
	With Mitigation	Medium	Medium	High	Positive	High	Medium	High
An increase in security and safety risks resulting from the influx of job seekers and road activity associated with the construction and operations of similar facilities	Without Mitigation	Medium	Medium	High	Negative	High	Medium	Medium
	With Mitigation	Low	Low	High	Negative	Medium	Low	High
Traffic and Transportation								
Traffic congestion	Without Mitigation	High	Medium	Low	Negative	High	Medium	Medium
	With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium

13. IMPACT STATEMENT

The proposed Boshoek SEF 1 has the potential to provide much needed renewable energy to the country's grid. The use of renewable energy to provide power to South Africa is supported at international, national, provincial and local level. Given South Africa's need for additional electricity generation and the need to decrease the country's dependency on coal-based power, renewable energy has been identified as a national priority, with Solar energy identified as one of the readily available, technically viable and commercially cost-effective sources of renewable energy.

The impacts of the proposed development need to be viewed in the context of the country's energy mix and the negative externalities associated with the current dominant energy source of coal, often in areas of high potential soils, such as the Eastern Highveld, and the pollution that this form of energy generates. With this comparison in mind the impact of solar energy facility is minimal compared to the damaging impacts of coal mining and coal-fired power generation. Indeed, solar energy is associated with positive externalities in the form of Economic Development benefits and the cheaper tariff at which it is bought. Therefore, in perspective, the impacts of the proposed facility can be motivated as necessary in decreasing the impacts in areas where agricultural potential plays a more significant role and in the role of externalities associated with power production.

The potential positive impacts associated with the proposed project is further recognised through the creation of jobs for the local community, and the positive contributions to the socio-economic development of the surrounding areas and local communities.

Should the proposed Boshoek SEF 1 be developed, the actual physical footprint of the Solar development and associated infrastructure will occupy a small area of land compared to the total project area. Livestock grazing and other agricultural activities can continue in parallel with the operation of the PV panels. The project will have no significant impact in terms of loss of agricultural productivity. Should the mitigation measures identified by specialists and the recommendations of the EMPr be effectively implemented the negative impacts associated with the proposed project will be significantly reduced.

The negative impacts associated with the proposed Boshoek SEF 1 are considered acceptable by the specialists, provided that all recommendations and mitigations are complied with and adhered to.

Taking into consideration the findings of the EIA process for the proposed development and the fact that recommended mitigation measures have been used to inform the project design and preferred layout of the facility, it is the opinion of the EAP that most negative impacts associated with the implementation of the proposed project have been mitigated to acceptable levels. While there are potential negative environmental impacts associated with the proposed development, the extent of the positive benefits associated with the implementation of the project in terms of renewable energy supply and positive local and regional economic impact are considered to outweigh the negative impacts.

According to the cumulative impact assessment conducted by the various specialists, the cumulative impact can be considered of low – medium significance after all mitigations are put in place.

The period for which the EA is required is 10 years.

13.1 CONDITIONS TO BE INCLUDED IN THE ENVIRONMENTAL AUTHORIZATION

Any specialist conditions which must be considered during all phases of the development and or EMPr, is provided below for the Department to consider should the development receive favourable Environmental Authorisation.

SOIL, LAND USE AND AGRICULTURAL POTENTIAL

Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 30 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-filled, the topsoil must be back-filled last, so that it remains at the surface. Topsoil should only be stripped in areas that are excavated. Across the majority of the site, including construction lay down areas, it will be much more effective for rehabilitation, to retain the topsoil in place. If levelling requires significant cutting, topsoil should be temporarily stockpiled and then re-spread after cutting, so that there is a covering of topsoil over the entire cut surface. It will be advantageous to have topsoil and vegetation cover below the panels during the operational phase to control dust and erosion.

AVIFAUNA

From an Avifaunal perspective, it is recommended that a final walkthrough be done, and the purpose of the walkthrough would be for any additional mitigation measures, which does not constitute post-environmental authorisation studies.

FRESHWATER AND WETLANDS (AQUATICS)

Recommended mitigation measures to be included in the environmental authorisation are as follows:

All freshwater resource features and their associated buffer areas should be regarded as NO-GO areas apart from the spanning of WC1 and the use/upgrade of existing watercourse crossings.

In order to avoid any indirect impacts on these freshwater resource features as a result of the construction and operation of the SEF:

- No activities may be allowed outside of the development areas.
- Implement appropriate measures to ensure strict use and management of all hazardous materials used on site.
- Implement appropriate measures to ensure strict management of potential sources of pollutants (e.g. litter, hydrocarbons from vehicles and machinery, cement during construction etc.).
- Working protocols incorporating pollution control measures and approved method statements for the project must be strictly enforced and implemented by the contractor/s.
- Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- All bare areas, as a result of the development, should be revegetated with locally occurring species, to bind the soil and limit erosion potential.
- Site rehabilitation should aim to restore surface drainage patterns, natural soil and vegetation as far as is feasible.

- Any storm-water within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities
- Stormwater from the substations and other hard stand areas, must be managed using appropriate channels and swales when located within steep areas.
- No stormwater runoff must be allowed to discharge directly into any wetland feature, and flows from these substations should be allowed to dissipate over a broad area covered by natural vegetation.
- Storm water run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any storm water leaving the switching station sites.
- Silt traps should be used where there is a danger of topsoil eroding and entering streams and other sensitive areas.
- Construction of gabions and other stabilisation features to prevent erosion, if deemed necessary.

HERITAGE, ARCHAEOLOGY AND PALEONTOLOGY

- A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts during the implementation of the EMPr;
- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified;
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted; and
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.

SOCIO-ECONOMIC

- Local labour should be utilised where possible, to enhance the positive impact of employment creation in the area. Local businesses should be involved with the construction activities where possible. It is imperative that local labour be sourced to ensure that benefits accrue to the local communities. Preference should thus be given to the use of local labour during the construction and operational phases of the project as far as possible; and
- Locals should also be allowed an opportunity to be included in a list of possible local suppliers and service providers, enhancing the multiplier effect.

TRAFFIC AND TRANSPORTATION

A Traffic Management Plan (TMP) is required to outline specific traffic management measures across all phases of the development. This is included in Section 14 of the EMPr.

VISUAL AND LANDSCAPE

Avoid vegetation stripping in straight lines but rather non-geometric shapes that blend with the landscape. Maintain a 10m vegetative buffer (of existing and/or established indigenous trees) outside the project footprint and along the adjacent public roads to restrict visibility and to shield against potential glare to motorists.

14. CONCLUSION

Based on the finding of the specialist studies, the information contained in this EIAR and the evolution of the site development plan, it is the opinion of the EAP that the proposed development can be authorised, provided the above listing mitigation measures as well as those contained in the EMPr are adhered to by the applicant.

APPENDIX A EAP DECLARATION OF INDEPENDENCE AND CV

APPENDIX B ENVIRONMENTAL MANAGEMENT PROGRAMMES

ERM HAS OVER 160 OFFICES ACROSS THE FOLLOWING COUNTRIES AND TERRITORIES WORLDWIDE

Argentina
Australia
Belgium
Brazil
Canada
China
Colombia
France
Germany
Ghana
Guyana
Hong Kong
India
Indonesia
Ireland
Italy
Japan
Kazakhstan
Kenya
Malaysia
Mexico
Mozambique
The Netherlands
New Zealand
Peru
Poland
Portugal
Puerto Rico
Romania
Senegal
Singapore
South Africa
South Korea
Spain
Switzerland
Taiwan
Tanzania
Thailand
UAE
UK
US
Vietnam

ERM Southern Africa (Pty) Ltd.
1st Floor
Great Westerford
240 Main Road, Rondebosch
Cape Town, 7700
South Africa
T +27 21 681 5400

www.erm.com