



Wildebekstkuil PV Generation (Pty) Ltd

DEVELOPMENT OF THE 9.9MW WILDEBEESTKUIL 1 SOLAR PV PLANT & 132KV POWER LINE, 9.9MW WILDEBEESTKUIL 2 SOLAR PV PLANT & 132KV POWER LINE AND ASSOCIATED INFRASTRUCTURE NEAR LEEUDORINGSTAD IN THE NORTH WEST PROVINCE

Palaeontological Desktop Assessment

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WILDEBEESTKUIL PV GENERATION (PTY) LTD

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PALAEONTOLOGICAL DESKTOP ASSESSMENT

EXECUTIVE SUMMARY

Banzai Environmental (Pty) Ltd (hereafter referred to as "Banzai") was appointed by PGS to undertake a Palaeontological desktop assessment for Wildebeestkuil PV Generation (Pty) Ltd for the 9.9 megawatt (MW) Wildebeestkuil 1 Solar Photovoltaic (PV) Plant & 132 kilovolt (kV) Power Line, 9.9MW Wildebeestkuil 2 Solar PV Plant & 132kV Power Line and associated infrastructure near Leeudoringstad, Maquassi Hills Local Municipality North West Province.

It should be noted that a combined report has been compiled for both proposed solar PV plants and power lines (namely Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line). This is due to the fact that the proposed solar PV plants and power line corridors are located on the same properties, are identical in nature and have the same associated impacts and recommended mitigation measures. Where certain findings and/or mitigation measures are project specific, this has been indicated in the relevant section of this report.

The development footprint is underlain by the Allanridge Formation (Ventersdorp Supergroup). The Ventersdorp Supergroup characterise a major occurrence of igneous extrusion that is associated with fracturing of the Kaapvaal Craton approximately 2.7 Ga (billion years) ago. The Late Archaean Allanridge succession is almost fully composed of resistant-weathering, dark green lavas and associated pyroclastic rocks.

Impact Statement

The ancient basement rocks, including the Allanridge Formation, are not known to be fossiliferous and thus there is no possibility that the rocks of the Allanridge Formation will contain any fossils. **Thus, the construction and operation of the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line may be authorized as the whole extent of the development footprint is not considered as sensitive in terms of palaeontological resources.**

As mentioned, three (3) power line corridor route alternatives for the proposed 132kV power line associated with each solar PV plant were identified and assessed. These alternatives essentially provide for different power line route alignments contained within an assessment corridor. The three (3) power line corridor route alternatives associated with each solar PV plant were considered during the site visit and impact assessment.

Table 1: Combined Comparative Assessment of Power Line Corridor Route Alternatives – Wildebeestkuil 1 and Wildebeestkuil 2

Key to Table 6

PREFERRED	The alternative will result in a low impact / reduce the impact / result in a positive impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Wildebeestkuil 1 Solar PV Plant & 132kV Power Line:

Alternative	Preference	Reasons (incl. potential issues)
Power Line Corridor Route Alternative		
Option 1	No preference	The impact on paleontological heritage is seen as negligible
Option 2A	No preference	The impact on paleontological heritage is seen as negligible
Option 2B	No preference	The impact on paleontological heritage is seen as negligible

Wildebeestkuil 2 Solar PV Plant & 132kV Power Line:

Alternative	Preference	Reasons (incl. potential issues)
Power Line Corridor Route Alternative		
Option 1	No preference	The impact on paleontological heritage is seen as negligible
Option 2A	No preference	The impact on paleontological heritage is seen as negligible
Option 2B	No preference	The impact on paleontological heritage is seen as negligible

Based on the comparative assessment of alternatives undertaken in the tables above the alternatives will result in an equal impact and none if preferred above the other.

NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND ENVIRONMENTAL IMPACT REGULATIONS, 2014 (AS AMENDED) - REQUIREMENTS FOR SPECIALIST REPORTS (APPENDIX 6)

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
1. (1) A specialist report prepared in terms of these Regulations must contain-	
a) details of-	
i. the specialist who prepared the report; and	1.3
ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 4
c) an indication of the scope of, and the purpose for which, the report was prepared;	1.1
(cA) an indication of the quality and age of base data used for the specialist report;	1.4
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	5.2
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	1.4
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	1.4
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	N/A
g) an identification of any areas to be avoided, including buffers;	6
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	2
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;	5.2
k) any mitigation measures for inclusion in the EMPr;	6
l) any conditions for inclusion in the environmental authorisation;	6
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	6
n) a reasoned opinion-	6
i. (as to) whether the proposed activity, activities or portions thereof should be authorised;	
(iA) regarding the acceptability of the proposed activity or activities; and	
ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	

o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
q) any other information requested by the competent authority.	N/A
2) Where a government notice <i>gazetted</i> by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	GN648

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PALAEONTOLOGICAL DESKTOP ASSESSMENT

Contents

1.	INTRODUCTION	1
1.1	Scope and Objectives	1
1.2	Terms of Reference	1
1.3	Specialist Credentials	2
1.4	Assessment Methodology	2
1.5	Additional sources consulted	3
2.	ASSUMPTIONS AND LIMITATIONS	3
3.	TECHNICAL DESCRIPTION	3
3.1	Project history	3
3.2	Project Location	4
3.3	Wildebeestkuil 1 and Wildebeestkuil 2 Solar PV Plant - Solar PV Plant Components	8
3.4	Alternatives	14
3.4.1	Location alternatives	14
3.4.2	Technology alternatives	14
3.4.3	Layout alternatives	14
3.4.4	The operational aspects of the activity	16
3.4.5	'No-go' alternative	16
4.	LEGAL REQUIREMENT AND GUIDELINES	16
4.1	Statutory Framework: The National Heritage Resources (Act 25 of 1999)	16
4.1.1	Notice 648 of the Government Gazette 45421	17
4.1.2	NEMA – Appendix 6 requirements	19
5.	GEOLOGICAL AND PALAEONTOLOGICAL HISTORY	19
5.1	Cumulative Impacts	20

5.2	Overall Impact Rating	22
5.3	No-Go Alternative	24
5.4	Summary of impact findings.....	24
6.	COMPARATIVE ASSESSMENT OF ALTERNATIVES	24
7.	CONCLUSION	25
7.1	Impact Statement.....	26
7.2	Alternative assessment.....	26
8.	REFERENCES.....	28

List of Tables

Table 1: Combined Comparative Assessment of Power Line Corridor Route Alternatives – Wildebeestkuil 1 and Wildebeestkuil 2	ii
Table 2: Reporting requirements for GN648.....	17
Table 3: Proposed Renewable Energy Projects in the Area	20
Table 4: Impact rating table for Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line (including associated infrastructure) – All phases	23
Table 5: Geological summary of the area.....	24
Table 6: Combined Comparative Assessment of Power Line Corridor Route Alternatives – Wildebeestkuil 1 and Wildebeestkuil 2	24
Table 7: Geological summary of the area.....	26
Table 8: Combined Comparative Assessment of Power Line Corridor Route Alternatives – Wildebeestkuil 1 and Wildebeestkuil 2	26
Table 9: Rating of impacts criteria	30
..	

List of Figures

Figure 1: Regional context - Wildebeestkuil 1 Solar PV Plant & 132kV Power Line.....	5
Figure 2: Regional context - Wildebeestkuil 2 Solar PV Plant & 132kV Power Line.....	6
Figure 3: Site locality - Wildebeestkuil 1 Solar PV Plant & 132kV Power Line	7
Figure 4: Site Locality – Wildebeestkuil 2 Solar PV Plant & 132kV Power Line	7
Figure 5: Proposed layout – Wildebeestkuil 1 Solar PV Plant	10
Figure 6: Proposed layout – Wildebeestkuil 1 Solar PV Plant: 132kV Power Line Corridor Alternatives	11
Figure 7: Proposed layout – Wildebeestkuil 2 Solar PV Plant.....	12

Figure 8: Proposed layout – Wildebeestkuil 2 Solar PV Plant: 132kV Power Line Corridor Alternatives	13
Figure 9: Environmental screening tool - palaeontology sensitivity (Wildebeestkuil 1 and Wildebeestkuil 2 Solar PV Plants & 132kV Power Lines)	18
Figure 10: The surface geology of the proposed two 9.9MW Solar Photovoltaic power plants on farm Wildebeestkuil 59 and farm Leeuwbosch 44, Leeudoringstad, Maquassi Hills Local Municipality, North West Province (Wildebeestkuil in black, powerline corridor in red)	19
Figure 11: Regional renewable energy projects for the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line	21
Figure 12: Regional renewable energy projects for the Wildebeestkuil 2 Solar PV Plant & 132kV Power Line	22

List of Appendices

- Appendix A: Impact Assessment Matrix
- Appendix B: CV of specialist
- Appendix C: Terms of reference

Glossary of Terms

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Cultural Landscapes Terminology

“perceptual qualities” Aspects of a landscape which are perceived through the senses, specifically views and aesthetics.

“cultural landscape” A representation of the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (World Heritage Committee, 1992). Includes and extends beyond the study site boundaries.

“cultural landscape area” These are single unique areas which are the discrete geographical areas of a particular landscape type. Each will have its own individual character and identity, even though it shares the same generic characteristics with other areas of the same type.

“study site” The study site is assumed to include the area within the boundaries of the proposed development

“characteristics” elements, or combination of elements, which make a particular contribution to distinctive character.

“elements” individual components which make up the landscape, such as trees and fences.

“landscape character” A distinct, and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.

“landscape character assessment” This is the process of identifying and describing variation in the character of the landscape. It seeks to identify and explain the unique combination of elements and features (characteristics) that make landscapes distinctive. This process results in the production of a Landscape Character Assessment.

“sense of place” The unique quality or character of a place, whether natural, rural or urban. It relates to uniqueness, distinctiveness or strong identity.

“scenic route” A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trail.

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

Fossil

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage

That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage resources

This means any place or object of cultural significance and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa;

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

List of Abbreviations

Acronyms	Description
DEFF	Department of Environment, Forestry and Fisheries
EAP	Environmental Assessment Practitioner
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PDA	Palaeontological Desktop Assessment
PHRA	Provincial Heritage Resources Agency
RoD	Record of Decision
SAHRA	South African Heritage Resources Agency

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PALAEONTOLOGICAL DESKTOP ASSESSMENT

1. INTRODUCTION

Banzai Environmental (Pty) Ltd (hereafter referred to as “Banzai”) was appointed by PGS to undertake a Palaeontological desktop assessment (PDA) for Wildebeestkuil PV Generation (Pty) Ltd for the 9.9 megawatt (MW) Wildebeestkuil 1 Solar Photovoltaic (PV) Plant & 132 kilovolt (kV) Power Line, 9.9MW Wildebeestkuil 2 Solar PV Plant & 132kV Power Line and associated infrastructure near Leeudoringstad, Maquassi Hills Local Municipality North West Province. The overall objective of the solar PV plants and power lines is to generate electricity (by capturing solar energy) to feed into the national electricity grid and “wheel” the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a National Energy Regulator of South Africa (NERSA)-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

It should be noted that a combined report has been compiled for both proposed solar PV plants and power lines (namely Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line). This is due to the fact that the proposed solar PV plants and power line corridors are located on the same properties, are identical in nature and have the same associated impacts and recommended mitigation measures. Where certain findings and/or mitigation measures are project specific, this has been indicated in the relevant section of this report.

1.1 Scope and Objectives

The aim of the study is to identify possible palaeontological resources, sites, finds and sensitive areas that may occur in the study area for the BA study. The HIA aims to inform the BA in the development of a comprehensive Environmental Management Programme (EMPr) to assist the developer in managing palaeontological resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

1.2 Terms of Reference

Please see **Appendix D**.

1.3 Specialist Credentials

The author (Elize Butler) has an MSc in Palaeontology from the University of the Free State, Bloemfontein, South Africa. She has been working in Palaeontology for more than twenty-four years. She has extensive experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the Karoo Basin. She has been a member of the Palaeontological Society of South Africa (PSSA) for 12 years. She has been conducting PIAs since 2014.

1.4 Assessment Methodology

The objective of a PDA is to determine the impact of the development on potential palaeontological material at the site.

According to the "SAHRA APM Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports" the aims of the PIA are: 1) to **identify** the palaeontological status of the exposed rock as well as rock formations just below the surface in the development footprint; 2) to estimate the **palaeontological importance** of the formations; 3) to determine the **impact** on fossil heritage; and 4) to recommend how the developer ought to protect or mitigate damage to fossil heritage.

The terms of reference of a PIA are as follows:

General Requirements:

- Adherence to the content requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations 2014, as amended;
- Adherence to all applicable best practice recommendations, appropriate legislation and authority requirements;
- Submit a comprehensive overview of all appropriate legislation, guidelines;
- Description of the proposed project and provide information regarding the developer and consultant who commissioned the study,
- Description and location of the proposed development and provide geological and topographical maps
- Provide Palaeontological and geological history of the affected area.
- Identification sensitive areas to be avoided (providing shapefiles/kmls) in the proposed development;
- Evaluation of the significance of the planned development during the Pre-construction, Construction, Operation, Decommissioning Phases and Cumulative impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative:
 - a. **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity.
 - b. **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity.
 - c. **Cumulative impacts** are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities.

- Fair assessment of alternatives (infrastructure alternatives have been provided):
- Recommend mitigation measures to minimise the impact of the proposed development; and
- Implications of specialist findings for the proposed development (such as permits, licenses etc).

1.5 Additional sources consulted

In compiling this report the following sources were consulted:

- The Palaeosensitivity Map from the SAHRIS website.
- Geological map 1:100 000, Geology of the Republic of South Africa (Visser 1984)
- Geological Map 1: 250 000 2630 Mbabane (Council for Geoscience).
- A Google Earth map with polygons of the proposed development was obtained from *PGS Heritage Consultants*.

2. ASSUMPTIONS AND LIMITATIONS

The accuracy of PDA is reduced by several factors which may include the following: the databases of institutions are not always up to date and relevant locality and geological information were not accurately documented in the past. Various remote areas of South Africa have not been assessed by palaeontologists and data is based on aerial photographs alone. Geological maps concentrate on the geology of an area and the sheet explanations were never intended to focus on palaeontological heritage.

Similar Assemblage Zones, but in different areas is used to provide information on the presence of fossil heritage in an unmapped area. Desktop studies of similar geological formations and Assemblage Zones generally **assume** that exposed fossil heritage is present within the development area. The accuracy of the Palaeontological Impact Assessment is thus improved considerably by conducting a field-assessment.

No fieldwork was required as the SAHRIS palaeontological sensitivity was rated the palaeontological sensitivity as low.

3. TECHNICAL DESCRIPTION

3.1 Project history

The original BA process for the proposed Wildebeestkuil PV Generation (Pty) Ltd (hereafter referred to as "Wilderbeestkuil PV Generation") solar photovoltaic (PV) plant was initiated in August 2016. All specialist studies were undertaken and subsequently all site sensitivities were identified. The specialist studies and draft basic assessment reports (DBARs) were completed and released for 30-day public review. The BA was however put out on hold prior to submitting the final basic assessment reports (FBARs) to the Department of Environmental Affairs (DEA). In February 2017, the proposed capacity and layout of the solar PV plant was amended, and a new connection point and associated power line corridors were assessed. However, the project was put on hold prior to submitting the application forms to the DEA or commencing with the legislated

public participation process. In August of 2020, Wildebeestkuil PV Generation proposed an additional 9.9MW PV plant on the Wildebeestkuil site (now referred to as the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line) outside of all site sensitivities that were identified in 2016, and as such specialist studies have been commissioned to assess and verify the now two (2) solar PV plants and 132kV power line under the new Gazetted specialist protocols¹.

3.2 Project Location

Wildebeestkuil PV Generation is proposing to construct two (2) solar photovoltaic (PV) plants, two (2) 132kV power lines and associated infrastructure approximately 10km north-east of the town of Leeudoringstad in the Maquassi Hills Local Municipality, which falls within the Dr Kenneth Kaunda District Municipality in the North West Province of South Africa (hereafter referred to as the “proposed developments”) (**Figure 1** and **Figure 2**).

The proposed solar PV plants will be located on the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;
- Portion 14 of the Farm Wildebeestkuil No. 59; and
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59.

The combined extent of the above-mentioned properties is approximately 115.5ha.

The power line corridor alternatives associated with each proposed solar PV plant which were assessed as part of the respective BA processes traverse the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;
- Portion 14 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 5 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 7 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 29 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59;
- Portion 35 of the Farm Leeuwbosch No. 44;
- Portion 36 of the Farm Leeuwbosch No. 44;
- Portion 37 of the Farm Leeuwbosch No. 44; and

¹ GOVERNMENT GAZETTE No. 43110, 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, 20 MARCH 2020.

In terms of sections 24(5)(a), (h) and 44 of the National Environmental Management Act, 1998, prescribe general requirements for undertaking site sensitivity verification and for protocols for the assessment and minimum report content requirements of environmental impacts for environmental themes for activities requiring environmental authorisation, as contained in the Schedule hereto. When the requirements of a protocol apply, the requirements of Appendix 6 of the Environmental Impact Assessment Regulations, as amended, (EIA Regulations), promulgated under sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), are replaced by these requirements. Each protocol applies exclusively to the environmental theme identified within its scope. Multiple themes may apply to a single application for environmental authorisation, and assessments for these themes must be undertaken in accordance with the relevant protocol, or where no specific protocol has been prescribed, in accordance with the requirements of the EIA Regulations.

- Portion 38 of the Farm Leeuwbosch No. 44.

The proposed developments are located directly west of the Harvard Substation, where the current supply of electricity for the local areas and businesses is extracted from (**Figure 3 and Figure 4**).

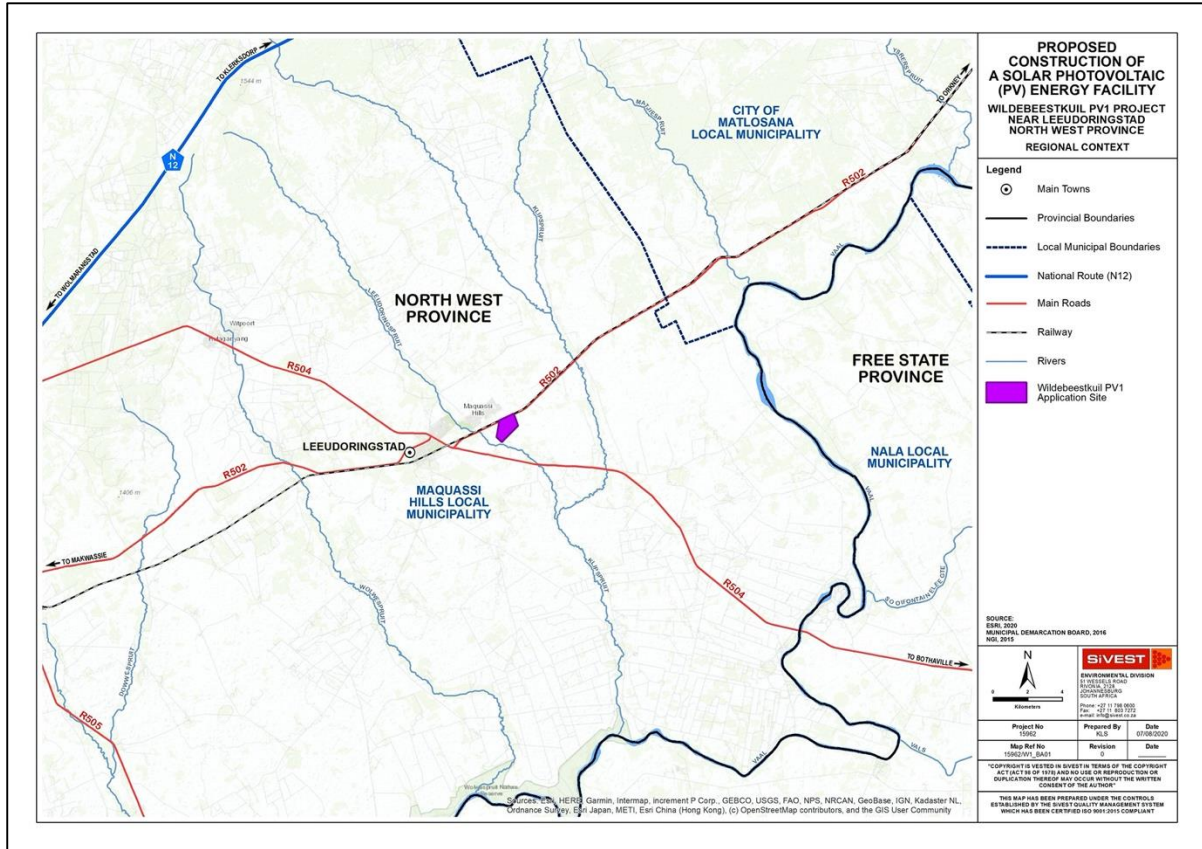


Figure 1: Regional context - Wildebeestkuil 1 Solar PV Plant & 132kV Power Line

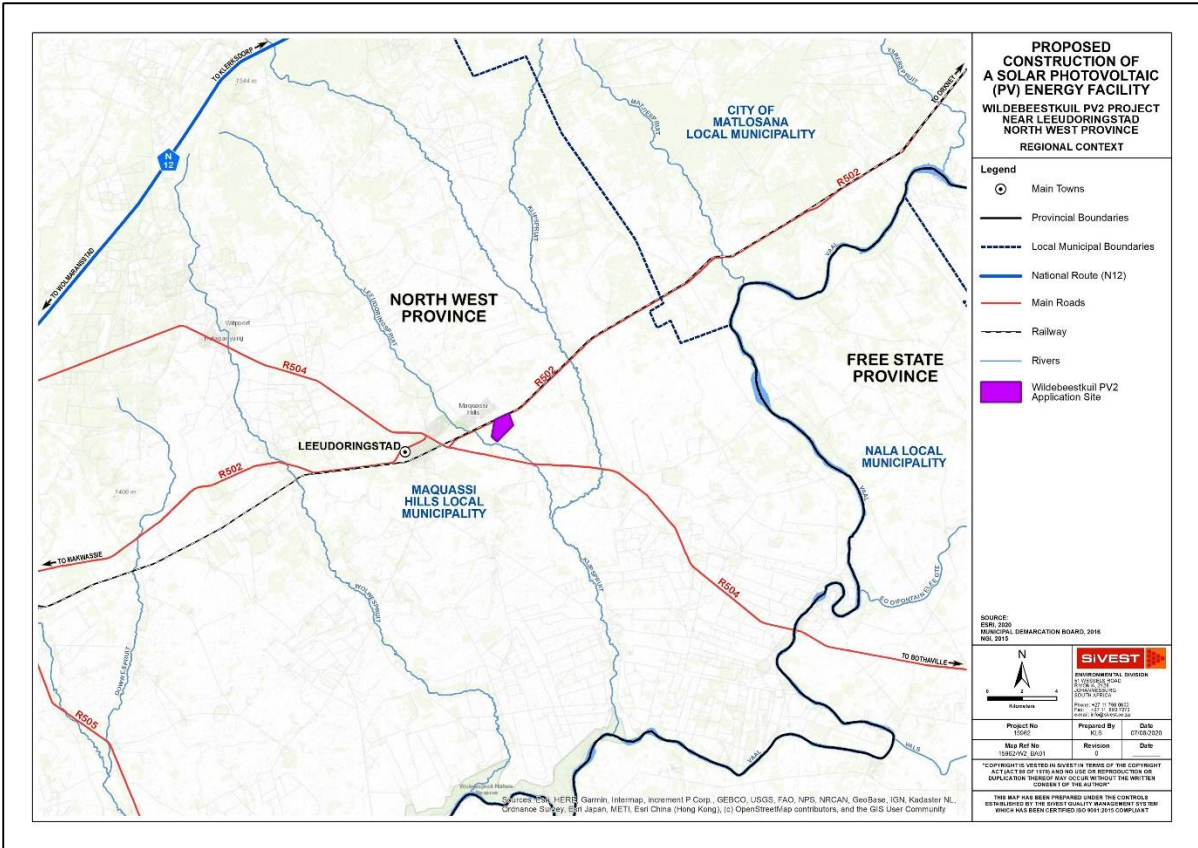


Figure 2: Regional context - Wildebeestkuil 2 Solar PV Plant & 132kV Power Line

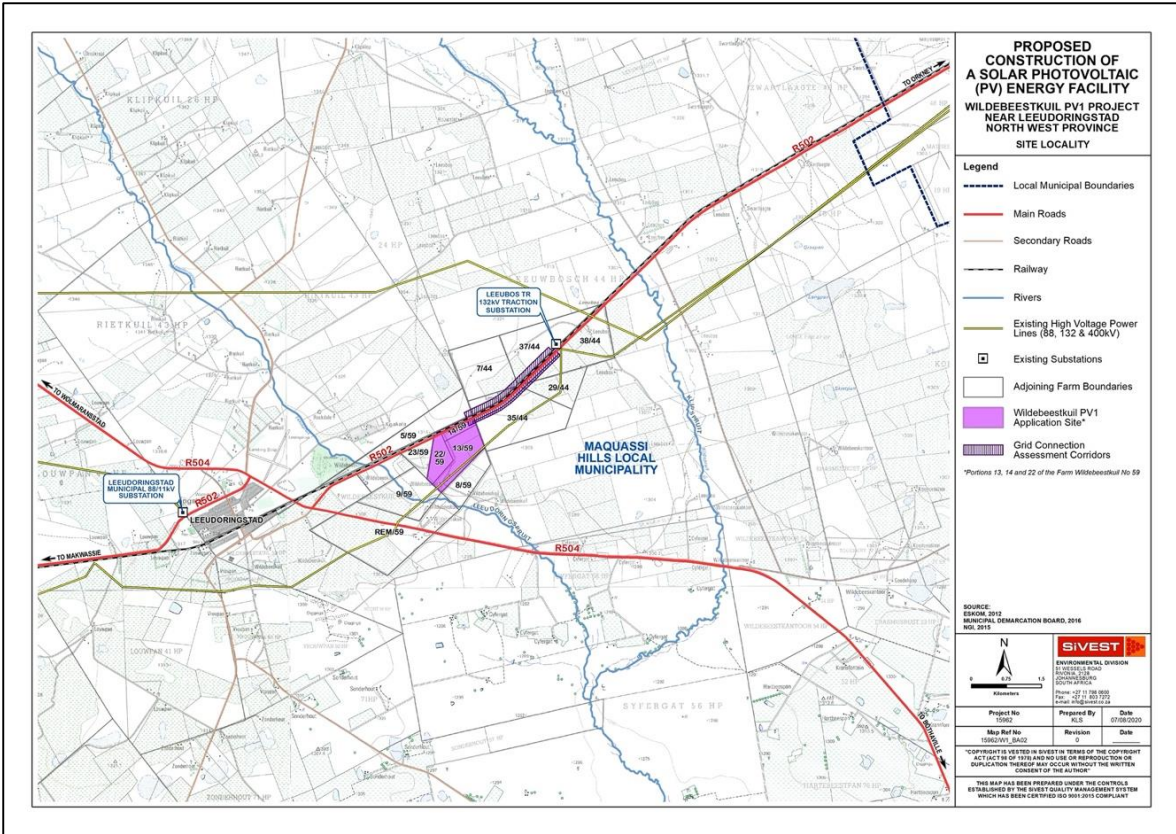


Figure 3: Site locality - Wildebeestkuil 1 Solar PV Plant & 132kV Power Line

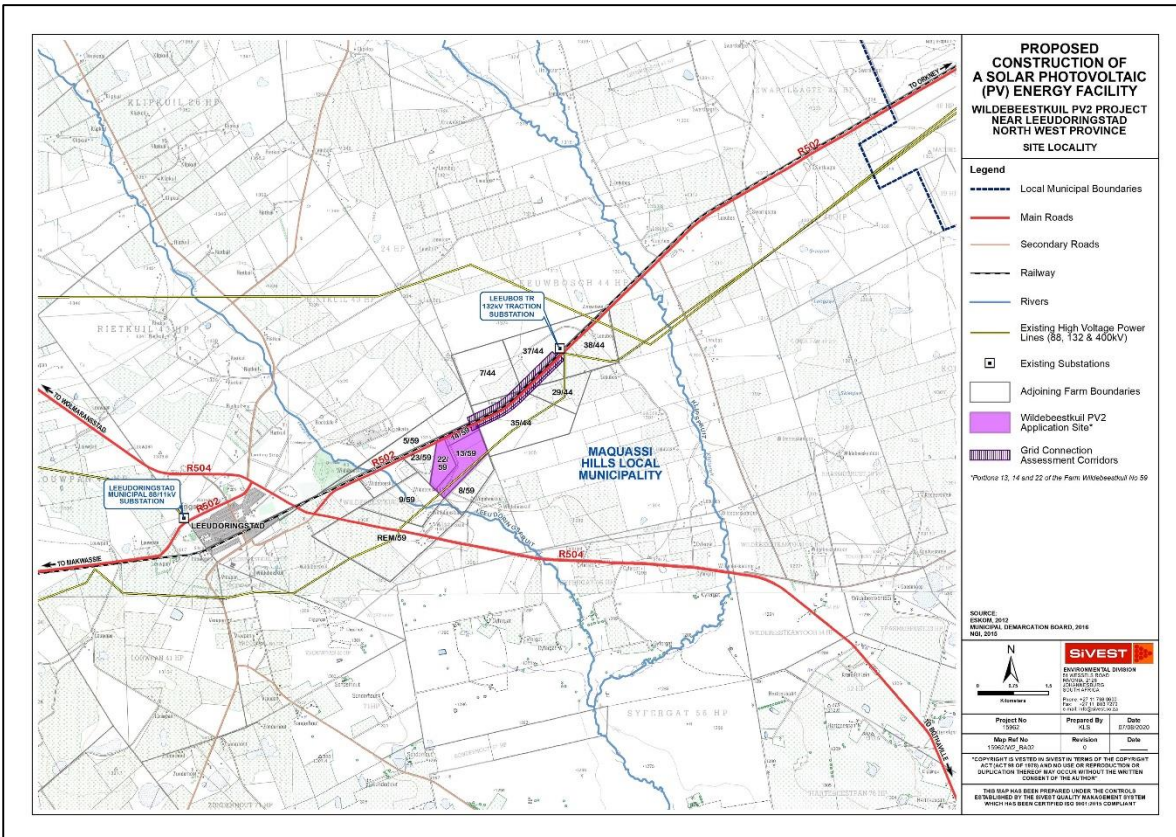


Figure 4: Site Locality – Wildebeestkuil 2 Solar PV Plant & 132kV Power Line

3.3 Wildebeestkuil 1 and Wildebeestkuil 2 Solar PV Plant - Solar PV Plant Components

As mentioned, Wildebeestkuil PV Generation is proposing to construct two (2) solar PV plants, two (2) 132kV power lines and associated infrastructure. The proposed developments will have total maximum generation capacities of up to approximately 9.9 megawatt (MW) respectively and will be referred to as the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line respectively. As mentioned, the overall objective of the proposed developments is to generate electricity (by capturing solar energy) to feed into the national electricity grid and “wheel” the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a NERSA-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

A summary of the key components to be constructed for each proposed solar PV plant is provided below

The key components to be constructed for each proposed solar PV plant are listed below:

- Solar PV field (arrays) comprising multiple PV modules
- PV panel mountings. PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology
- Each PV module will be approximately 2.5m long and 1.2m wide and mounted on supporting structures above ground. The final design details will become available during the detailed design phase of the proposed developments, prior to the start of construction
- The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed development

In addition, related infrastructure required are:

- Underground cabling ($\approx 0.8\text{m} \times 0.6$ wide)
- Guard House ($\approx 871\text{m}^2$)
- Temporary building zone ($\approx 2994\text{m}^2$)
- Switching Substation ($\approx 2000\text{m}^2$)
- Internal gravel roads ($\approx 3.5\text{m}$ width)
- Upgrade to existing roads; and
- Site fencing ($\approx 2.1\text{m}$ high)

In addition to the above, the electricity generated by the proposed solar PV plants will be fed into the national electricity grid via 132kV power lines, which will connect to the Leeudoringstad Solar Plant Substation (part of a separate BA process²). It should be noted that each proposed solar PV plant will consist of one (1) associated 132kV power line. Corridors between approximately 60m and 150m wide were assessed for the proposed power line corridor route alternatives associated with each proposed solar PV plant. This is to allow for flexibility to route the power lines within the assessed corridors. As such, the selected preferred power

² Proposed Leeudoringstad Solar Plant Substation part of separate BA process and will be authorised under a separate EA.

lines will be routed within the assessed corridors. The final servitudes will be routed within the power line corridors, and it is expected that the servitudes will not exceed 32m (**Figure 5** and **Figure 6**).

As mentioned, once fully developed, the intention is to generate electricity (by capturing solar energy) to feed into the national electricity grid and “wheel” the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a NERSA-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

The construction phase will be between 12 and 24 months and the operational lifespan will be approximately 20 years, depending on the length of the power purchase agreement with the relevant off taker.

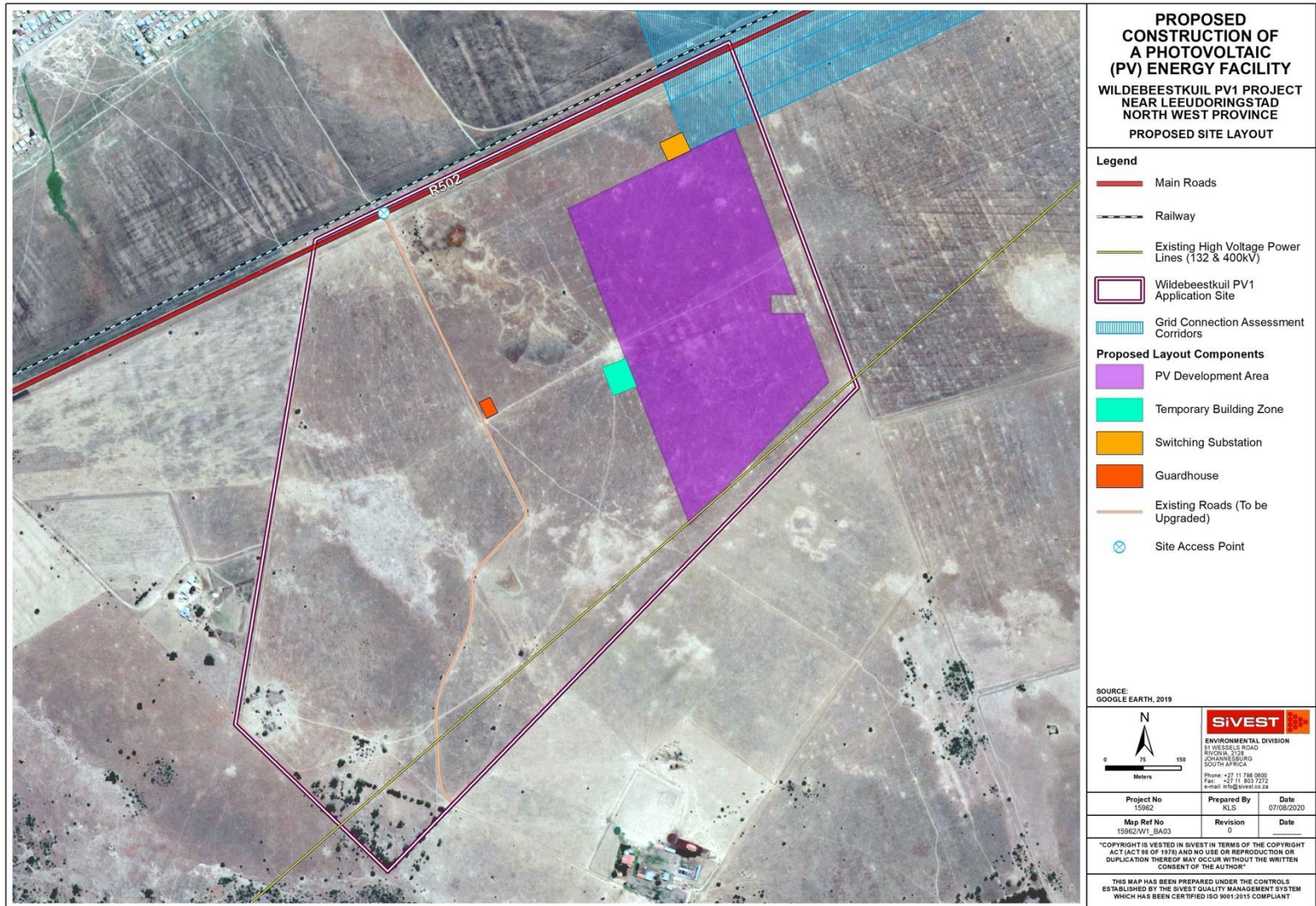


Figure 5: Proposed layout – Wilderbeestkui 1 Solar PV Plant

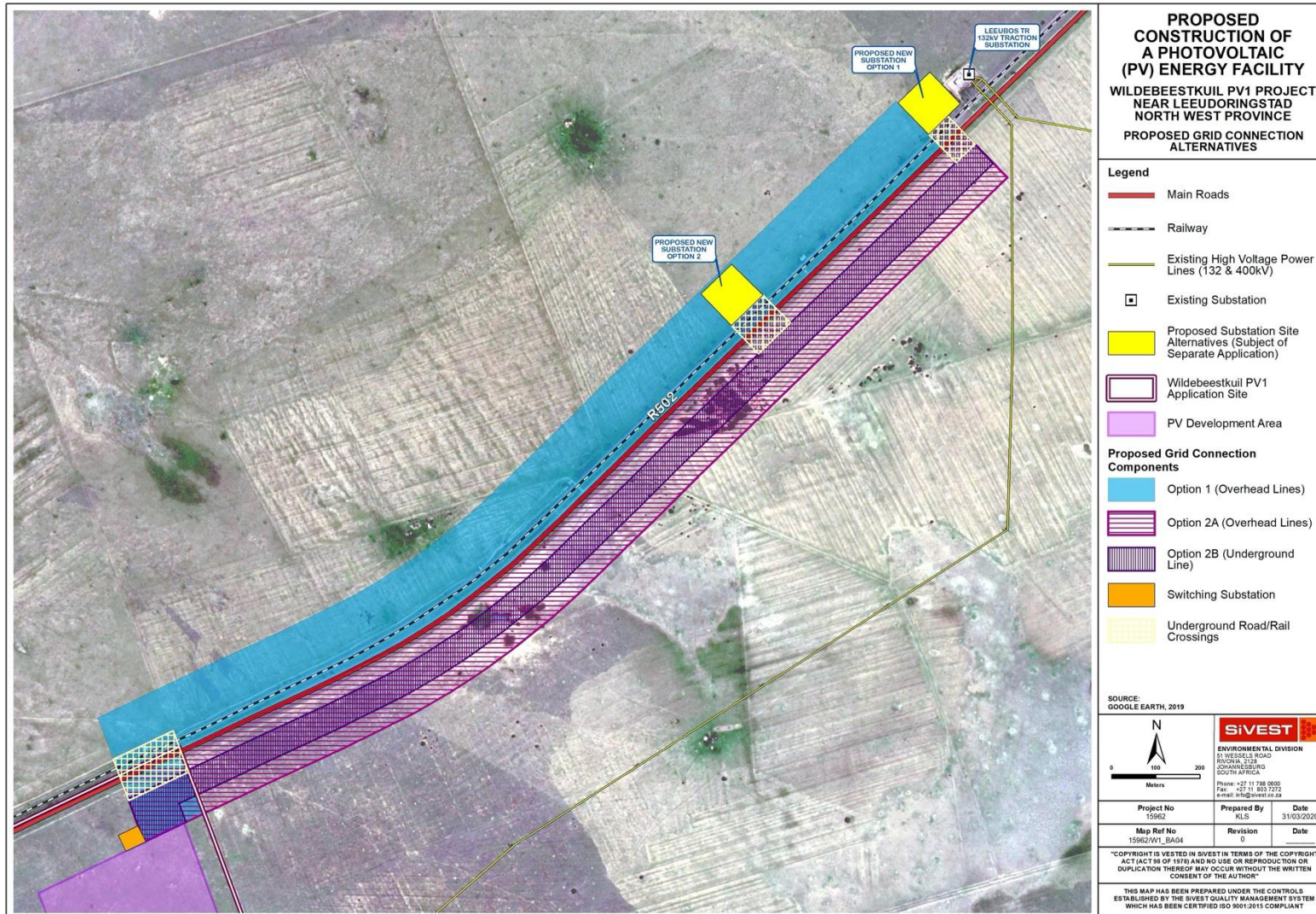


Figure 6: Proposed layout – Wildebeestkuil 1 Solar PV Plant: 132kV Power Line Corridor Alternatives

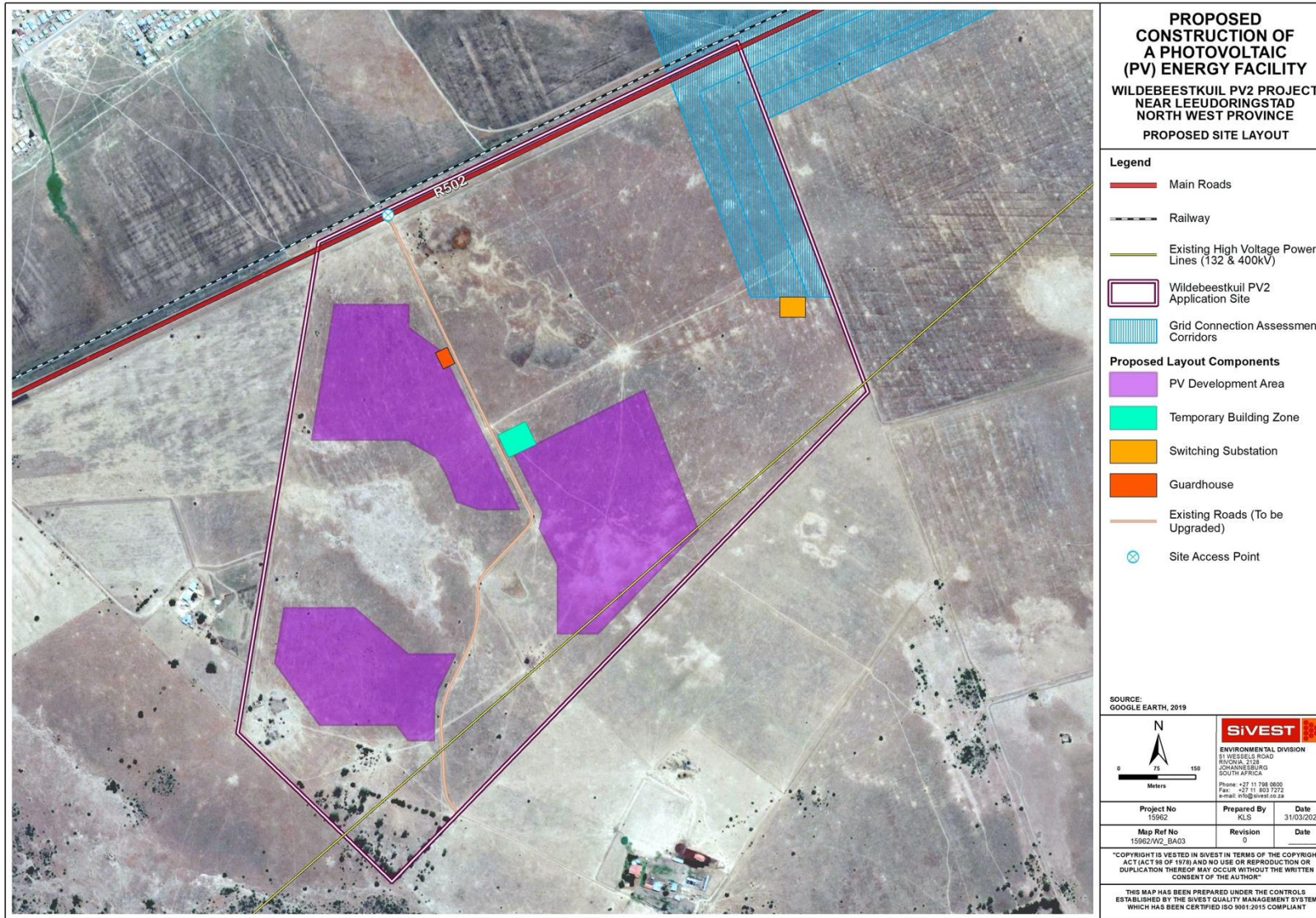


Figure 7: Proposed layout – Wildebeestkuil 2 Solar PV Plant

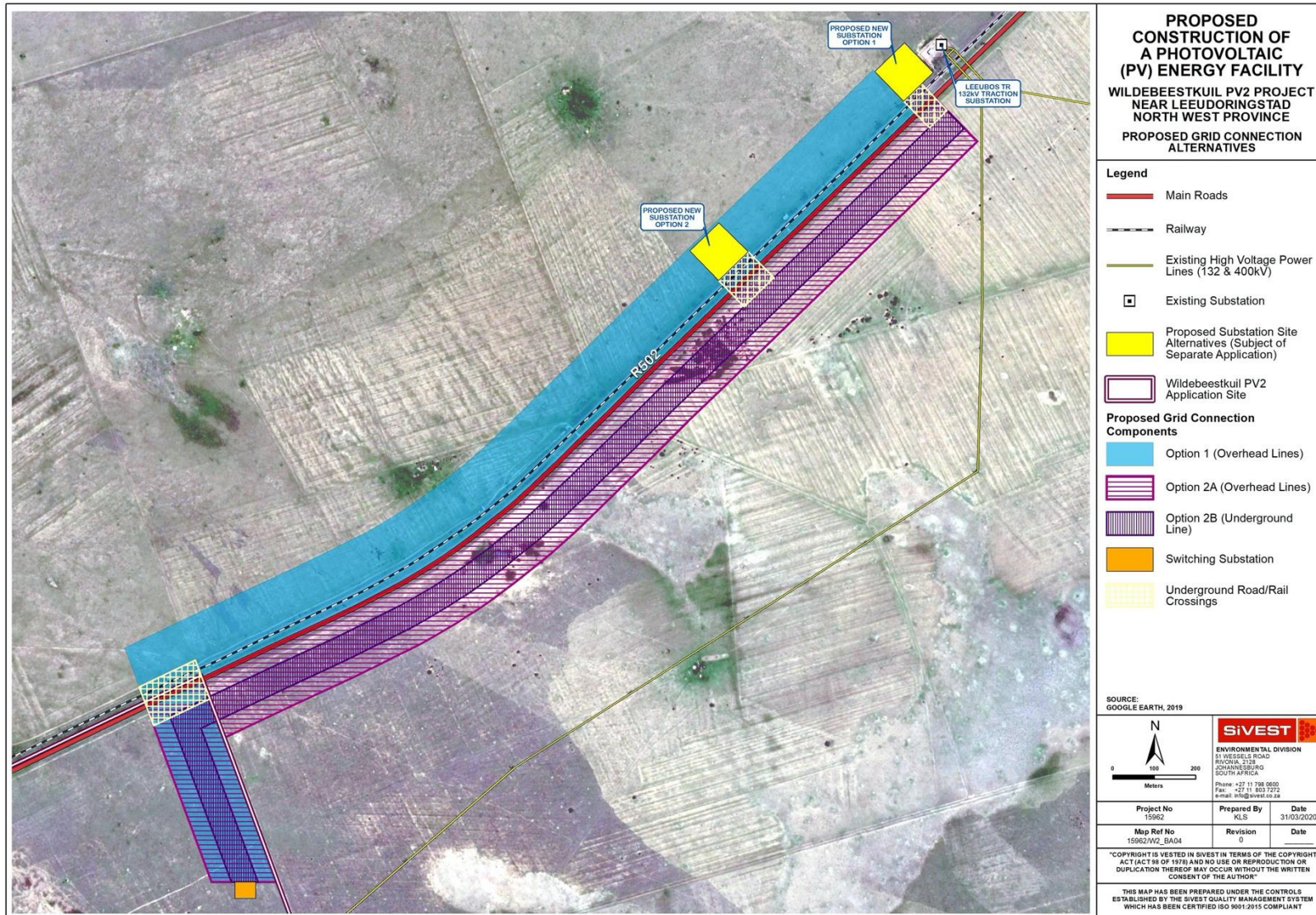


Figure 8: Proposed layout – Wildebeestkuil 2 Solar PV Pant: 132kV Power Line Corridor Alternatives

3.4 Alternatives

3.4.1 Location alternatives

No site alternatives for the proposed developments are being considered as the placement of solar PV installations and power lines is dependent on several factors, all of which are favourable at the proposed site location. This included land availability and topography, environmental sensitivities, distance to the national grid, solar resource site accessibility and current land use.

3.4.2 Technology alternatives

No other activity / technology alternatives are being considered. Renewable energy development in South Africa is highly desirable from a social, environmental and development point of view. Based on the flat terrain, the climatic conditions and current land use being agricultural, it was determined that the proposed site would be best-suited for a solar PV plants and associated power lines, instead of any other type of renewable energy technology. It is generally preferred to install wind energy facilities (WEFs) on elevated ground. In addition, concentrated solar power (CSP) installations are not feasible because they have a high water requirement and the project site is located in a relatively arid area. There is also not enough rainfall in the area to justify a hydro-electric plant. Therefore, the only feasible technology alternative on this site is solar PV with associated power lines, and as such this is the only technology alternative being considered.

3.4.3 Layout alternatives

No design or layout alternatives for the PV development areas, Switching Substations, Guard houses and Temporary Building Zones (and all other associated infrastructure) are being considered or assessed as part of the current BA processes. Design and layout alternatives were considered and assessed as part of a previous BA process that was never completed, and as such the PV development areas, Switching Substations, Guard houses and Temporary Building Zones (and all other associated infrastructure) have been placed to avoid site sensitivities identified as part of a previous BA process as well as the current BA processes. Specialist studies were originally undertaken in 2016 and all current layouts and/or positions being proposed were selected based on the environmental sensitivities identified as part of these studies in 2016. All specialist studies which were undertaken in 2016 were however updated in 2020 (including ground-truthing, where required) to focus on the impacts of the layouts being proposed as part of the current projects. The results of the updated specialist assessments have informed the layouts being proposed as part of the current BA processes. The proposed layouts have therefore been informed by the identified environmental sensitive and/or “no-go” areas.

Three (3) power line corridor route alternatives for the proposed 132kV power line associated with each solar PV plant were however identified and assessed by the respective specialists as part of the current BA process. These alternatives essentially provide for different power line route alignments contained within an assessment corridor. The power line corridor route alternatives were informed by the identified environmental sensitive and/or “no-go” areas. The power line corridor route alternatives work as follows:

WILDEBEESTKUIL 1 SOLAR PV PLANT & 132KV POWER LINE:

- **Power Line Corridor Option 1** - This involves an overhead power line which will run north of the R502, from the switching substation located within the Wildebeestkuil PV1 Solar PV Plant application

site to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation (part of separate BA process), depending on the alternative chosen as 'preferred' for the Leeudoringstad Solar Plant Substation site³. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil PV1 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

- **Power Line Corridor Option 2A** - This involves an overhead power line which will run south of the R502, from the switching substation located within the Wildebeestkuil PV1 Solar PV Plant application site to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation (part of separate BA process), depending on the alternative chosen as 'preferred' for the Leeudoringstad Solar Plant Substation site³. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil PV1 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.
- **Power Line Corridor Option 2B** - This involves an underground power line which will run south of the R502, from the switching substation located within the Wildebeestkuil PV1 Solar PV Plant application site to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation (part of separate BA process), depending on the alternative chosen as 'preferred' for the Leeudoringstad Solar Plant Substation site³. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil PV1 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

WILDEBEESTKUIL 2 SOLAR PV PLANT & 132KV POWER LINE:

- **Power Line Corridor Option 1** - This involves an overhead power line which will run north of the R502, from the switching substation located within the Wildebeestkuil 2 Solar PV Plant application site (namely Portion 14 of the Farm Wildebeestkuil No. 59) to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation, depending on the alternative chosen as "preferred" for the Leeudoringstad Solar Plant Substation site³. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil 2 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.
- **Power Line Corridor Option 2A** - This involves an overhead power line which will run south of the R502, from the switching substation located within the Wildebeestkuil 2 Solar PV Plant application site (namely Portion 14 of the Farm Wildebeestkuil No. 59) to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation, depending on the alternative chosen as "preferred" for the Leeudoringstad Solar Plant Substation site³. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil 2 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.
- **Power Line Corridor Option 2B** - This involves an underground power line which will run south of the R502, from the switching substation located within the Wildebeestkuil 2 Solar PV Plant application site (namely Portion 14 of the Farm Wildebeestkuil No. 59) to either Option 1 or Option 2 of the

³ 132kV power line corridor route associated with solar PV plant intrinsically linked to Leeudoringstad Solar Plant Substation site (part of separate on-going BA process). Leeudoringstad Solar Plant Substation site chosen as "preferred" by respective specialists as part of that separate BA process therefore informed connection point for power line corridor being proposed as part of this BA application.

Leeudoringstad Solar Plant Substation, depending on the alternative chosen as “preferred” for the Leeudoringstad Solar Plant Substation site³. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil 2 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

See **Figure 6** and **Figure 8** above for maps showing the above-mentioned 132kV power line corridor route alternatives for each proposed solar PV plant.

3.4.4 *The operational aspects of the activity*

No operational alternatives were assessed in the BA, as none are available for solar PV installations and power lines.

3.4.5 *‘No-go’ alternative*

The ‘no-go’ alternative is the option of not fulfilling the proposed projects. This alternative would result in no environmental impacts from the proposed projects on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the ‘no-go’ option would entail no development.

The ‘no-go option’ is a feasible option; however, this would prevent the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

4. LEGAL REQUIREMENT AND GUIDELINES

4.1 Statutory Framework: The National Heritage Resources (Act 25 of 1999)

Cultural Heritage in South Africa includes all heritage resources and is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). Heritage resources as defined in Section 3 of the Act include, “**all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens**”.

Palaeontological heritage is unique and non-renewable and is protected by the NHRA. Palaeontological resources may not be unearthed, broken, moved or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

This PIA forms part of the Heritage Impact Assessment (HIA) and adhere to the conditions of the Act. According to **Section 38 (1)**, an HIA is required to assess any potential impacts to palaeontological heritage within the development footprint where:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- the construction of a bridge or similar structure exceeding 50 m in length;
- any development or other activity which will change the character of a site—

- (exceeding 5 000 m² in extent; or
- involving three or more existing erven or subdivisions thereof; or
- involving three or more erven or divisions thereof which have been consolidated within the past five years; or
- the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority
- the re-zoning of a site exceeding 10 000 m² in extent;
- or any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority.

4.1.1 Notice 648 of the Government Gazette 45421

Although minimum standard for archaeological and palaeontological assessments⁴ were published by SAHRA and Heritage Western Cape⁵⁶, Government Notice (GN) 648 requires sensitivity verification for a site selected on the national web based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this GN is listed in **Table 2** and the applicable section in this report noted.

Table 2: Reporting requirements for GN648

GN 648	Relevant section in report	Where not applicable in this report
2.2 (a) a desk top analysis, using satellite imagery;	section 4	
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	section 5	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web based environmental screening tool;	section 5	-
2.3(b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	Section 5 provides a description of the current use and confirms the status in the screening report	

⁴ South African Heritage Resources Agency. 2007. *Minimum Standards: Archaeological and Palaeontological Components Of Impact Assessment Reports*. May 2007

⁵ Heritage Western Cape. 2016. *Guide for Minimum Standards for Archaeology and Palaeontology Reports Submitted to Heritage Western Cape*. June 2016

⁶ Heritage Western Cape. 2016. *Guidelines for Heritage Impact Assessments required in terms of Section 38 of the National Heritage Resources Act (Act 25 of 1999)*.

An assessment of the Environmental Screening tool provides the following sensitivity ratings for palaeontological resources medium (Error! Reference source not found.).

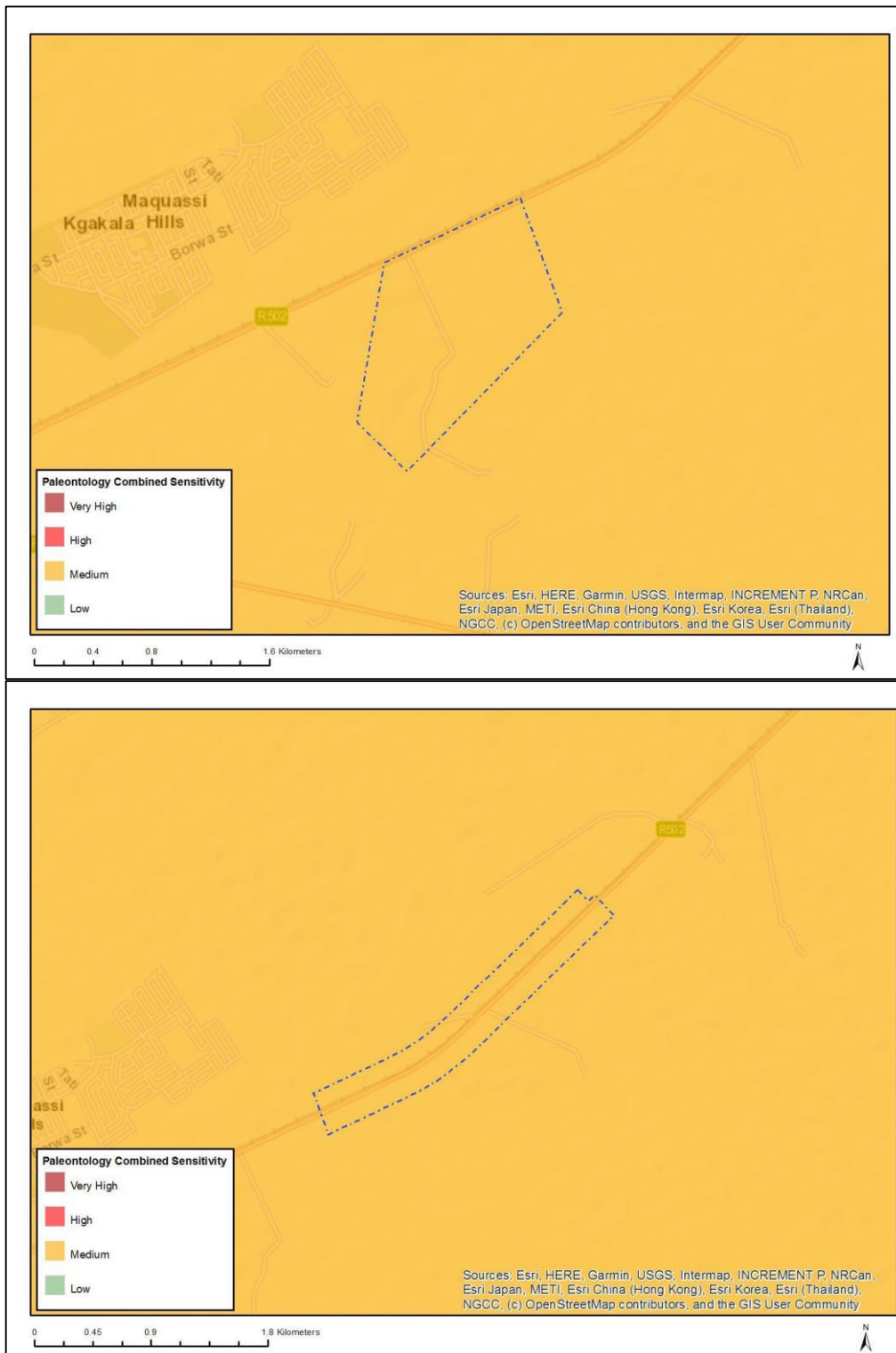


Figure 9: Environmental screening tool - palaeontology sensitivity (Wildebeestkuil 1 and Wildebeestkuil 2 Solar PV Plants & 132kV Power Lines)

4.1.2 NEMA – Appendix 6 requirements

The HIA report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) Appendix 6 requirements for specialist reports as indicated in the table on page 2 and 3 of this report. For ease of reference the table provides cross references to the report sections where these requirements have been addressed.

5. GEOLOGICAL AND PALAEOLOGICAL HISTORY⁷

The development footprints are underlain by the Allanridge Formation (Ventersdorp Supergroup) (**Figure 10**). The Ventersdorp Supergroup characterise a major occurrence of igneous extrusion that is associated with fracturing of the Kaapvaal Craton approximately 2.7 Ga (billion years) ago. At the top of the Ventersdorp succession are the greyish-green amygdaloidal and porphyritic lavas, mainly basaltic andesites, of the Allanridge Formation. The Late Archaean Allanridge succession is almost entirely composed of resistant-weathering, dark green lavas and associated pyroclastic rocks (Van der Westhuizen and De Bruijn, 2006).

The ancient basement rocks, including the **Allanridge Formation, are not known to be fossiliferous.**

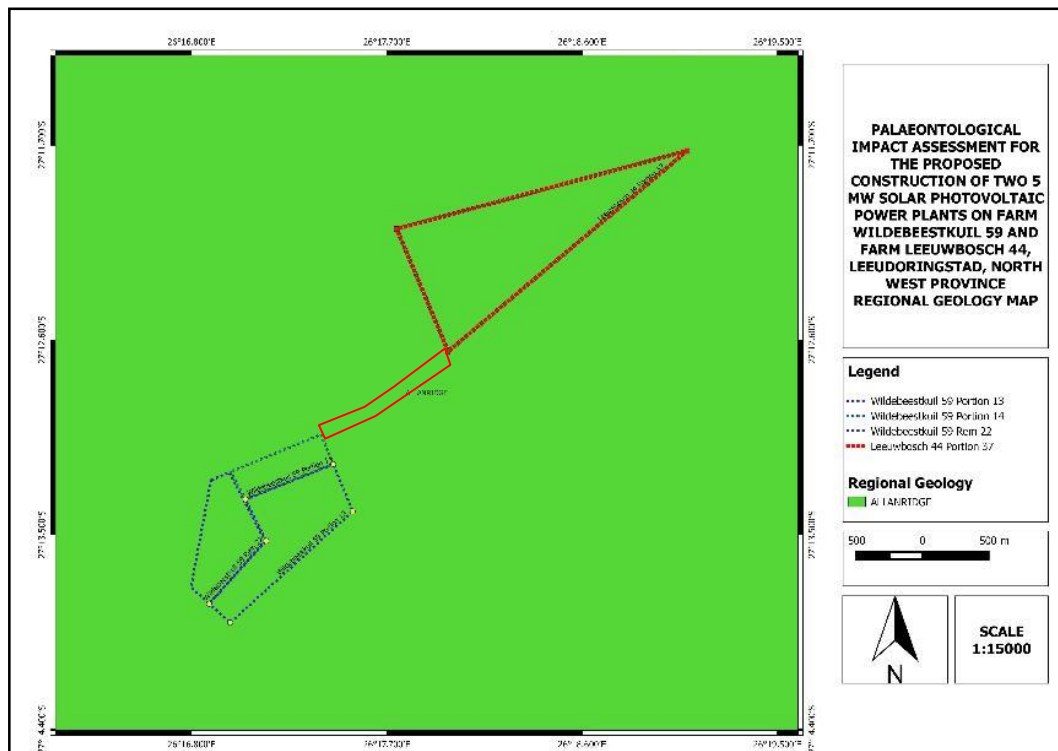


Figure 10: The surface geology of the proposed two 9.9MW Solar Photovoltaic power plants on farm Wildebeestkuil 59 and farm Leeuwbosch 44, Leeudoringstad, Maquassi Hills Local Municipality, North West Province (Wildebeestkuil in black, powerline corridor in red)

⁷ Due to the fact that the proposed solar PV plants and 132kV power line corridors are located on the same properties, the geological and palaeontological history for both proposed solar PV plants and 132kV power lines will be identical. Where certain information is project specific, this has been indicated in the relevant sub-section.

5.1 Cumulative Impacts

This section evaluates the possible cumulative impacts (CI) on heritage resources with the addition of the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line. The CI on palaeontological resources evaluated a 50-kilometer radius (**Figure 11** and **Figure 12**). **Table 3** below lists the projects that will need to be considered when examining the cumulative impacts.

Table 3: Proposed Renewable Energy Projects in the Area

Proposed Development	Reference Number	Current Status of BA / EIA	Proponent	Proposed Capacity	Farm Details
Leeuwbosch 1 Solar PV Plant Project	TBA	BA ongoing	Leeuwbosch PV Generation (Pty) Ltd	9.9MW	Farm Leeuwbosch 44
Leeuwbosch 2 Solar PV Plant Project	TBA	BA ongoing	Leeuwbosch PV Generation (Pty) Ltd	9.9MW	Farm Leeuwbosch 44
Wildebeestkuil 1 Solar PV Plant Project	TBA	BA ongoing	Wildebeestkuil PV Generation (Pty) Ltd	9.9MW	Farm Wildebeestkuil 59
Wildebeestkuil 2 Solar PV Plant Project	TBA	BA ongoing	Wildebeestkuil PV Generation (Pty) Ltd	9.9MW	Farm Wildebeestkuil 59
Bokamoso Solar Energy Facility	14/12/16/3/3/2/559	Project has received environmental authorisation	SunEdison	75MW	A portion of the farm Matjesspruit 145

An analysis of the palaeontological resources and evaluation of the cumulative impact has shown that the possible cumulative impact will be of a low significance as the broader area for the Leeuwbosch 1 and Leeuwbosch 2 solar PV plants and 132kV power lines is not considered as highly fossiliferous (**Table 4**).

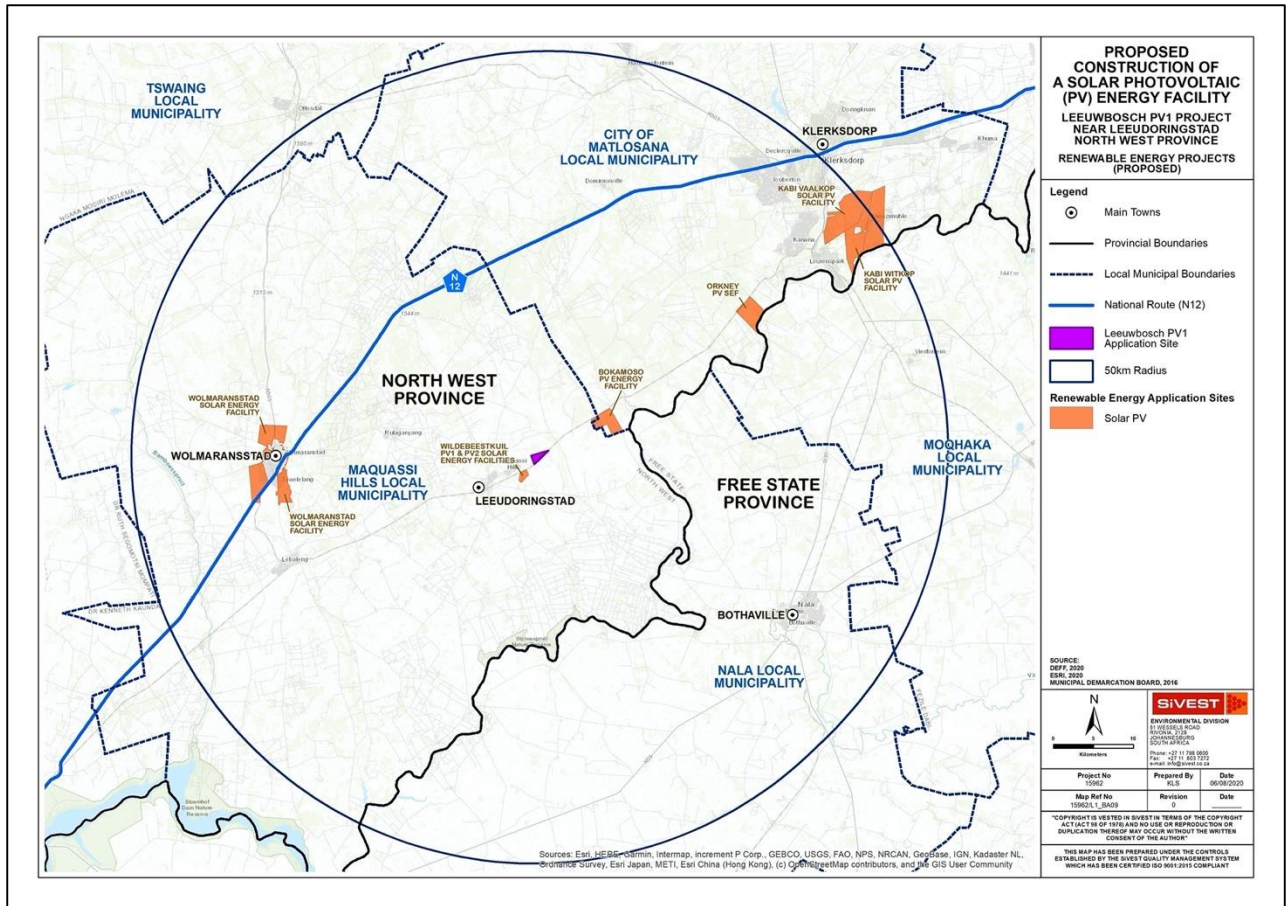


Figure 11: Regional renewable energy projects for the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line

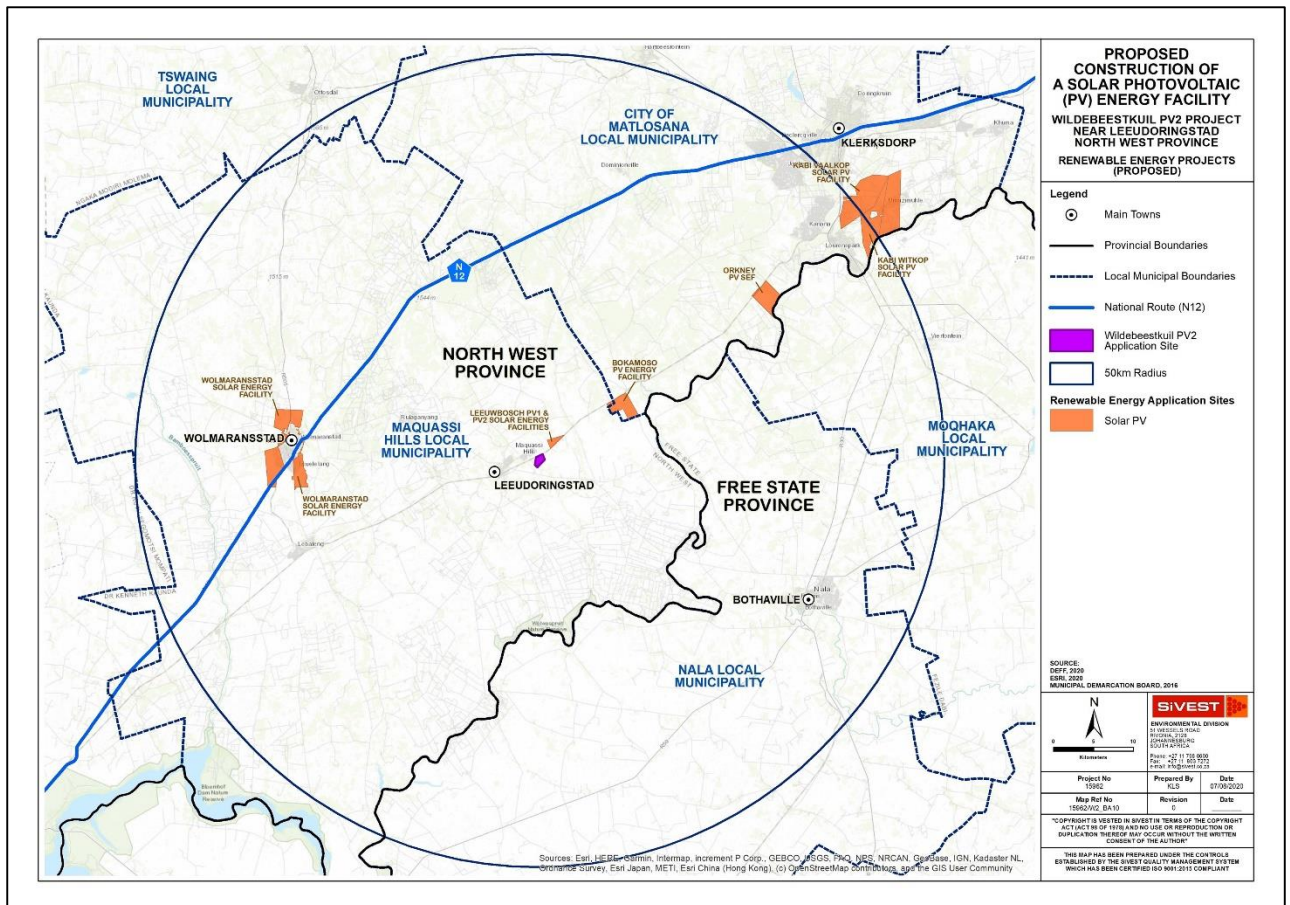


Figure 12: Regional renewable energy projects for the Wildebeestkuil 2 Solar PV Plant & 132kV Power Line

5.2 Overall Impact Rating

Considering the sensitivity of possible palaeontological heritage resources within the geological units, an overall low impact rating for all the phases of the project implementation predicted (**Table 4**).

Table 4: Impact rating table for Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line (including associated infrastructure) – All phases

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		
Construction Phase and Decommissioning Phase																						
Impact on palaeontological resources	Site clearance and excavations	1	1	4	1	3	1	10	-	Low	Implement a chance finds procedures handle any heritage resources discovered during construction. Implement recommendation in section 6.5 of this report.	1	1	4	1	3	1	10	-	Low		
Cumulative																						
Impact on palaeontological resources	Site clearance and vegetation stripping	1	1	4	1	3	1	10	-	Low	Implement a chance finds procedures handle any heritage resources discovered during construction	1	1	4	1	3	1	10	-	Low		
No-Go alternative																						
Impact on palaeontological resources	No development	1	4	1	1	3	1	+	10	Low	Implement a chance finds procedures handle any heritage resources discovered during construction	1	1	4	1	3	1	10	-	Low		

5.3 No-Go Alternative

It is mandatory to consider the “no-go” option in the BA process. The no development alternative option assumes the site remains in its current state, i.e. there is no construction of solar PV plants and power lines in the proposed project area and the *status quo* would continue.

5.4 Summary of impact findings

Table 5 below provides a summary of the findings of the impact rating and mitigation proposals.

Table 5: Geological summary of the area

Geological Unit	Rock types and age	Fossil heritage	Palaeontological sensitivity	Recommended mitigation
Allanridge Formation	Lavas and pyroclastics with minor siliciclastic lenses	No Fossil heritage is known from this Formation	Insensitive	None recommended
Ventersdorp Supergroup	Late Archaean (C. 2.7 GA)	-		

6. COMPARATIVE ASSESSMENT OF ALTERNATIVES

As mentioned, three (3) power line corridor route alternatives for the proposed 132kV power line associated with each solar PV plant were identified and assessed. These alternatives essentially provide for different power line route alignments contained within an assessment corridor. The three (3) power line corridor route alternatives associated with each solar PV plant were considered during the site visit and impact assessment.

Table 6: Combined Comparative Assessment of Power Line Corridor Route Alternatives – Wildebeestkuil 1 and Wildebeestkuil 2

Key to Table 6

PREFERRED	The alternative will result in a low impact / reduce the impact / result in a positive impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Wildebeestkuil 1 Solar PV Plant & 132kV Power Line:

Alternative	Preference	Reasons (incl. potential issues)
Power Line Corridor Route Alternative		
Option 1	No preference	The impact on paleontological heritage is seen as negligible

Alternative	Preference	Reasons (incl. potential issues)
Option 2A	No preference	The impact on paleontological heritage is seen as negligible
Option 2B	No preference	The impact on paleontological heritage is seen as negligible

Wildebeestkuil 2 Solar PV Plant & 132kV Power Line:

Alternative	Preference	Reasons (incl. potential issues)
Power Line Corridor Route Alternative		
Option 1	No preference	The impact on paleontological heritage is seen as negligible
Option 2A	No preference	The impact on paleontological heritage is seen as negligible
Option 2B	No preference	The impact on paleontological heritage is seen as negligible

Based on the comparative assessment of alternatives undertaken in the tables above the alternatives will result in an equal impact and none is preferred above the other.

7. CONCLUSION

The broader area near Leeudoringstad is underlain by the Allanridge Formation (Ventersdorp Supergroup). The Ventersdorp Supergroup characterise a major occurrence of igneous extrusion that is associated with fracturing of the Kaapvaal Craton approximately 2.7 Ga (billion years) ago. The Late Archaean Allanridge succession is almost entirely composed of resistant-weathering, dark green lavas and associated pyroclastic rocks (Van der Westhuizen and De Bruijn, 2006 and references therein). A summary of the findings is provided in the **Table 7** below.

It should be noted that a combined report has been compiled for both proposed solar PV plants and power lines (namely Wildbeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line). This is due to the fact that the proposed solar PV plants and power line corridors are located on the same properties, are identical in nature and have the same associated impacts and recommended mitigation measures. Where certain findings and/or mitigation measures are project specific, this has been indicated in the relevant section of this report.

The ancient basement rocks, including the **Allanridge Formation, are not known to be fossiliferous** and thus there is no possibility that the rocks of the Allanridge Formation will contain any fossils. Thus, the construction and operation of the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line may be authorised as the whole extent of the development footprint is not considered as sensitive in terms of palaeontological resources.

Table 7: Geological summary of the area

Geological Unit	Rock types and age	Fossil heritage	Palaeontological sensitivity	Recommended mitigation
Allanridge Formation	Lavas and pyroclastics with minor siliciclastic lenses	No Fossil heritage is known from this Formation	Insensitive	None recommended
Ventersdorp Supergroup	Late Archaean (C. 2.7 GA)	-		

7.1 Impact Statement

The ancient basement rocks, including the Allanridge Formation, are not known to be fossiliferous and thus there is no possibility that the rocks of the Allanridge Formation will contain any fossils. **Thus, the construction and operation of the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line may be authorized as the whole extent of the development footprint is not considered as sensitive in terms of palaeontological resources.**

7.2 Alternative assessment

As mentioned, three (3) power line corridor route alternatives for the proposed 132kV power line associated with each solar PV plant were identified and assessed. These alternatives essentially provide for different power line route alignments contained within an assessment corridor. The three (3) power line corridor route alternatives associated with each solar PV plant were considered during the site visit and impact assessment.

Table 8: Combined Comparative Assessment of Power Line Corridor Route Alternatives – Wildebeestkuil 1 and Wildebeestkuil 2

Key to Table 6

PREFERRED	The alternative will result in a low impact / reduce the impact / result in a positive impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Wildebeestkuil 1 Solar PV Plant & 132kV Power Line:

Alternative	Preference	Reasons (incl. potential issues)
Power Line Corridor Route Alternative		
Option 1	No preference	The impact on paleontological heritage is seen as negligible
Option 2A	No preference	The impact on paleontological heritage is seen as negligible

Alternative	Preference	Reasons (incl. potential issues)
Option 2B	No preference	The impact on paleontological heritage is seen as negligible

Wildebekstkuil 2 Solar PV Plant & 132kV Power Line:

Alternative	Preference	Reasons (incl. potential issues)
Power Line Corridor Route Alternative		
Option 1	No preference	The impact on paleontological heritage is seen as negligible
Option 2A	No preference	The impact on paleontological heritage is seen as negligible
Option 2B	No preference	The impact on paleontological heritage is seen as negligible

Based on the comparative assessment of alternatives undertaken in the tables above the alternatives will result in an equal impact and none if preferred above the other.

8. REFERENCES

Johnson, M.R, Anhausser, C.R and Thomas, R.J. (eds) (2006). *The Geology of South Africa*. Geological Society of South Africa: Johannesburg: Council for Geoscience, Pretoria: Geological Society of South Africa, 691pp.

MCCARTHY, T., and RUBIDGE, B. (2005). *The story of Earth and life: a southern African perspective on a 4.6-billion-year journey*. 334pp. Struik, Cape Town.

Mac Rae, C. (1999). *Life etched in stone: fossils of South Africa*. The Geological Society of South Africa, Johannesburg, pp 305.



Appendix A

The Impact Assessment Scales used for this project

1 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) METHODOLOGY

The Environmental Impact Assessment (EIA) Methodology assists in evaluating the overall effect of a proposed activity on the environment. Determining of the significance of an environmental impact on an environmental parameter is determined through a systematic analysis.

1.1 Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (i.e. site, local, national or global), whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in **Table 7**.

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

1.2 Impact Rating System

The impact assessment must take account of the nature, scale and duration of effects on the environment and whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the various project stages, as follows:

- Planning;
- Construction;
- Operation; and
- Decommissioning.

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

1.2.1 Rating System Used to Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the possible mitigation of the impact. Impacts have been consolidated into one (1) rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

Table 9: Rating of impacts criteria

ENVIRONMENTAL PARAMETER
A brief description of the environmental aspect likely to be affected by the proposed activity (e.g. Surface Water).
ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE

Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity (e.g. oil spill in surface water).		
EXTENT (E)		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY (P)		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY (R)		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES (L)		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION (D)		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		

1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
INTENSITY / MAGNITUDE (I / M)		
Describes the severity of an impact (i.e. whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
SIGNIFICANCE (S)		

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:

$$\text{Significance} = (\text{Extent} + \text{probability} + \text{reversibility} + \text{irreplaceability} + \text{duration}) \times \text{magnitude/intensity.}$$

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.



Appendix B

Project team CV's

CURRICULUM VITAE

ELIZE BUTLER

PROFESSION: Palaeontologist
YEARS' EXPERIENCE: 26 years in Palaeontology

EDUCATION: B.Sc Botany and Zoology, 1988
University of the Orange Free State

B.Sc (Hons) Zoology, 1991
University of the Orange Free State

Management Course, 1991
University of the Orange Free State

M. Sc. *Cum laude* (Zoology), 2009
University of the Free State

Dissertation title: The postcranial skeleton of the Early Triassic non-mammalian Cynodont *Galesaurus planiceps*: implications for biology and lifestyle

Registered as a PhD fellow at the Zoology Department of the UFS 2013 to current

Dissertation title: A new gorgonopsian from the uppermost *Daptocephalus Assemblage Zone*, in the Karoo Basin of South Africa

MEMBERSHIP

Palaeontological Society of South Africa (PSSA) 2006-currently

EMPLOYMENT HISTORY

Part-time Laboratory assistant Department of Zoology & Entomology University of the Free State Zoology
1989-1992

Part-time laboratory assistant Department of Virology
University of the Free State Zoology 1992

Research Assistant National Museum, Bloemfontein 1993 – 1997

Principal Research Assistant National Museum, Bloemfontein
and Collection Manager 1998–currently

TECHNICAL REPORTS

Butler, E. 2014. Palaeontological Impact Assessment of the proposed development of private dwellings on portion 5 of farm 304 Matjesfontein Keurboomstrand, Knysna District, Western Cape Province. Bloemfontein.

Butler, E. 2014. Palaeontological Impact Assessment for the proposed upgrade of existing water supply infrastructure at Noupoort, Northern Cape Province. 2014. Bloemfontein.

Butler, E. 2015. Palaeontological impact assessment of the proposed consolidation, re-division and development of 250 serviced erven in Nieu-Bethesda, Camdeboo local municipality, Eastern Cape. Bloemfontein.

Butler, E. 2015. Palaeontological impact assessment of the proposed mixed land developments at Rooikraal 454, Vrede, Free State. Bloemfontein.

Butler, E. 2015. Palaeontological exemption report of the proposed truck stop development at Palmiet 585, Vrede, Free State. Bloemfontein.

Butler, E. 2015. Palaeontological impact assessment of the proposed Orange Grove 3500 residential development, Buffalo City Metropolitan Municipality East London, Eastern Cape. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Gonubie residential development, Buffalo City Metropolitan Municipality East London, Eastern Cape Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Ficksburg raw water pipeline. Bloemfontein.

Butler, E. 2015. Palaeontological Heritage Impact Assessment report on the establishment of the 65 mw Majuba Solar Photovoltaic facility and associated infrastructure on portion 1, 2 and 6 of the farm Witkoppies 81 HS, Mpumalanga Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed township establishment on the remainder of portion 6 and 7 of the farm Sunnyside 2620, Bloemfontein, Mangaung metropolitan municipality, Free State, Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Woodhouse 1 photovoltaic solar energy facilities and associated infrastructure on the farm Woodhouse729, near Vryburg, North West Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Woodhouse 2 photovoltaic solar energy facilities and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Orkney solar energy farm and associated infrastructure on the remaining extent of Portions 7 and 21 of the farm Wolvehuis 114, near Orkney, North West Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Spectra foods broiler houses and abattoir on the farm Maiden Manor 170 and Ashby Manor 171, Lukhanji Municipality, Queenstown, Eastern Cape Province. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed construction of the 150 MW Noupoort concentrated solar power facility and associated infrastructure on portion 1 and 4 of the farm Carolus Poort 167 and the remainder of Farm 207, near Noupoort, Northern Cape. Prepared for Savannah Environmental. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed Woodhouse 1 Photovoltaic Solar Energy facility and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed Woodhouse 2 Photovoltaic Solar Energy facility and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. Bloemfontein.

Butler, E. 2016. Proposed 132kV overhead power line and switchyard station for the authorised Solis Power 1 CSP project near Upington, Northern Cape. Bloemfontein.

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Butler, E. 2016. Recommendation from further Palaeontological Studies: Proposed Construction of the Modikwa Filling Station on a Portion of Portion 2 of Mooihoek 255 Kt, Greater Tubatse Local Municipality, Limpopo Province. Bloemfontein.

Butler, E. 2016. Recommendation from further Palaeontological Studies: Proposed Construction of the Heidedal filling station on Erf 16603, Heidedal Extension 24, Mangaung Local Municipality, Bloemfontein, Free State Province. Bloemfontein.

Butler, E. 2016. Recommended Exemption from further Palaeontological studies: Proposed Construction of the Gunstfontein Switching Station, 132kv Overhead Power Line (Single Or Double Circuit) and ancillary infrastructure for the Gunstfontein Wind Farm Near Sutherland, Northern Cape Province. Savannaha South Africa. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed Galla Hills Quarry on the remainder of the farm Roode Krantz 203, in the Lukhanji Municipality, division of Queenstown, Eastern Cape Province. Bloemfontein.

Butler, E. 2016. Chris Hani District Municipality Cluster 9 water backlog project phases 3a and 3b: Palaeontology inspection at Tsomo WTW. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed construction of the 150 MW Noupoot concentrated solar power facility and associated infrastructure on portion 1 and 4 of the farm Carolus Poort 167 and the remainder of Farm 207, near Noupoot, Northern Cape. Savannaha South Africa. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed upgrading of the main road MR450 (R335) from the Motherwell to Addo within the Nelson Mandela Bay Municipality and Sunday's river valley Local Municipality, Eastern Cape Province. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment construction of the proposed Metals Industrial Cluster and associated infrastructure near Kuruman, Northern Cape Province. Savannaha South Africa. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment for the proposed construction of up to a 132kv power line and associated infrastructure for the proposed Kalkaar Solar Thermal Power Plant near Kimberley, Free State and Northern Cape Provinces. PGS Heritage. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed development of two burrow pits (DR02625 and DR02614) in the Enoch Mgijima Municipality, Chris Hani District, Eastern Cape.

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Butler, E. 2016: Palaeontological desktop assessment of the establishment of the proposed residential and mixed use development on the remainder of portion 7 and portion 898 of the farm Knopjeslaagte 385 Ir, located near Centurion within the Tshwane Metropolitan Municipality of Gauteng Province. Bloemfontein.

Butler, E. 2017. Palaeontological impact assessment for the proposed development of a new cemetery, near Kathu, Gamagara local municipality and John Taolo Gaetsewe district municipality, Northern Cape. Bloemfontein.

Butler, E. 2017. Palaeontological Impact Assessment Of The Proposed Development Of The New Open Cast Mining Operations On The Remaining Portions Of 6, 7, 8 And 10 Of The Farm Kwaggafontein 8 In The Carolina Magisterial District, Mpumalanga Province. Bloemfontein.

Butler, E. 2017. Palaeontological Desktop Assessment for the Proposed Development of a Wastewater Treatment Works at Lanseria, Gauteng Province. Bloemfontein.

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Butler, E. 2017. Palaeontological Impact Assessment of the proposed construction of a 132KV powerline from the Tweespruit distribution substation (in the Mantsopa local municipality) to the Driedorp rural substation (within the Naledi local municipality), Free State province. Bloemfontein.

Butler, E. 2017. Palaeontological Desktop Assessment of the proposed development of the new coal-fired power plant and associated infrastructure near Makhado, Limpopo Province. Bloemfontein.

Butler, E. 2017. Palaeontological Impact Assessment of the proposed construction of a Photovoltaic Solar Power station near Collett substation, Middelburg, Eastern Cape. Bloemfontein.

Butler, E. 2017. Palaeontological Impact Assessment for the proposed township establishment of 2000 residential sites with supporting amenities on a portion of farm 826 in Botshabelo West, Mangaung Metro, Free State Province. Bloemfontein.

Butler, E. 2017. Palaeontological Desktop Assessment for the proposed prospecting right project without bulk sampling, in the Koa Valley, Northern Cape Province. Bloemfontein.

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Butler, E. 2017. Palaeontological Impact Assessment of the proposed Belvior aggregate quarry II on portion 7 of the farm Maidenhead 169, Enoch Mjijima Municipality, division of Queenstown, Eastern Cape. Bloemfontein.

Butler, E. 2017. PIA site visit and report of the proposed Galla Hills Quarry on the remainder of the farm Roode Krantz 203, in the Lukhanji Municipality, division of Queenstown, Eastern Cape Province. Bloemfontein.

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Butler, E. 2017. Palaeontological Desktop Assessment of the proposed construction of the Mangaung Gariep Water Augmentation Project. Bloemfontein.

Butler, E. 2017. Palaeontological Impact Assessment of the proposed Belvoir aggregate quarry II on portion 7 of the farm Maidenhead 169, Enoch Mjijima Municipality, division of Queenstown, Eastern Cape. Bloemfontein.

Butler, E. 2017. Palaeontological Impact Assessment of the proposed construction of the Melkspruit-Rouxville 132KV Power line. Bloemfontein.

Butler, E. 2017. Palaeontological Desktop Assessment of the proposed development of a railway siding on a portion of portion 41 of the farm Rustfontein 109 is, Govan Mbeki local municipality, Gert Sibande district municipality, Mpumalanga Province. Bloemfontein.

Butler, E. 2017. Palaeontological Impact Assessment of the proposed consolidation of the proposed Ilima Colliery in the Albert Luthuli local municipality, Gert Sibande District Municipality, Mpumalanga Province. Bloemfontein.

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Butler, E. 2017. Palaeontological Impact Assessment of the proposed development of the H2 Energy Power Station and associated infrastructure on Portions 21; 22 And 23 of the farm Hartebeestspruit in the Thembisile Hani Local Municipality, Nkangala District near Kwamhlanga, Mpumalanga Province. Bloemfontein.

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Butler, E. 2017. Palaeontological Desktop Assessment of the proposed Swaziland-Mozambique border patrol road and Mozambique barrier structure. Bloemfontein.

Butler, E. 2017. Palaeontological Impact Assessment of the proposed diamonds alluvial & diamonds general prospecting right application near Christiana on the remaining extent of portion 1 of the farm Kaffraria 314, registration division HO, North West Province. Bloemfontein.

Butler, E. 2017. Palaeontological Desktop Assessment for the proposed development of Wastewater Treatment Works on Hartebeesfontein, near Panbult, Mpumalanga. Bloemfontein.

Butler, E. 2017. Palaeontological Desktop Assessment for the proposed development of Wastewater Treatment Works on Rustplaas near Piet Retief, Mpumalanga. Bloemfontein.

Butler, E. 2018. Palaeontological Impact Assessment for the Proposed Landfill Site in Luckhoff, Letsemeng Local Municipality, Xhariep District, Free State. Bloemfontein.

Butler, E. 2018. Palaeontological Impact Assessment of the proposed development of the new Mutsho coal-fired power plant and associated infrastructure near Makhado, Limpopo Province. Bloemfontein.

Butler, E. 2018. Palaeontological Impact Assessment of the authorisation and amendment processes for Manangu mine near Delmas, Victor Khanye local municipality, Mpumalanga. Bloemfontein.

Butler, E. 2018. Palaeontological Desktop Assessment for the proposed Mashishing township establishment in Mashishing (Lydenburg), Mpumalanga Province. Bloemfontein.

Butler, E. 2018. Palaeontological Desktop Assessment for the Proposed Mlonzi Estate Development near Lusikisiki, Ngquza Hill Local Municipality, Eastern Cape. Bloemfontein.

Butler, E. 2018. Palaeontological Phase 1 Assessment of the proposed Swaziland-Mozambique border patrol road and Mozambique barrier structure. Bloemfontein.

Butler, E. 2018. Palaeontological Desktop Assessment for the proposed electricity expansion project and Sekgame Switching Station at the Sishen Mine, Northern Cape Province. Bloemfontein.

Butler, E. 2018. Palaeontological field assessment of the proposed construction of the Zonnebloem Switching Station (132/22kV) and two loop-in loop-out power lines (132kV) in the Mpumalanga Province. Bloemfontein.

Butler, E. 2018. Palaeontological Field Assessment for the proposed re-alignment and decommissioning of the Firham-Platrand 88kv Powerline, near Standerton, Lekwa Local Municipality, Mpumalanga province. Bloemfontein.

Butler, E. 2018. Palaeontological Desktop Assessment of the proposed Villa Rosa development In the Buffalo City Metropolitan Municipality, East London. Bloemfontein.

Butler, E. 2018. Palaeontological field Assessment of the proposed Villa Rosa development In the Buffalo City Metropolitan Municipality, East London. Bloemfontein.

Butler, E. 2018. Palaeontological desktop assessment of the proposed Mookodi – Mahikeng 400kV line, North West Province. Bloemfontein.

Butler, E. 2018. Palaeontological Desktop Assessment for the proposed Thornhill Housing Project, Ndlambe Municipality, Port Alfred, Eastern Cape Province. Bloemfontein.

Butler, E. 2018. Palaeontological desktop assessment of the proposed housing development on portion 237 of farm Hartebeestpoort 328. Bloemfontein.

Butler, E. 2018. Palaeontological desktop assessment of the proposed New Age Chicken layer facility located on holding 75 Endicott near Springs in Gauteng. Bloemfontein.

Butler, E. 2018 Palaeontological Desktop Assessment for the development of the proposed Leslie 1 Mining Project near Leandra, Mpumalanga Province. Bloemfontein.

Butler, E. 2018. Palaeontological field assessment of the proposed development of the Wildealskloof mixed use development near Bloemfontein, Free State Province. Bloemfontein.

Butler, E. 2018. Palaeontological Field Assessment of the proposed Megamor Extension, East London. Bloemfontein

Butler, E. 2018. Palaeontological Impact Assessment of the proposed diamonds Alluvial & Diamonds General Prospecting Right Application near Christiana on the Remaining Extent of Portion 1 of the Farm Kaffraria 314, Registration Division HO, North West Province. Bloemfontein.

Butler, E. 2018. Palaeontological Impact Assessment of the proposed construction of a new 11kV (1.3km) Power Line to supply electricity to a cell tower on farm 215 near Delportshoop in the Northern Cape. Bloemfontein.

Butler, E. 2018. Palaeontological Field Assessment of the proposed construction of a new 22 kV single wood pole structure power line to the proposed MTN tower, near Britstown, Northern Cape Province. Bloemfontein.

Butler, E. 2018. Palaeontological Exemption Letter for the proposed reclamation and reprocessing of the City Deep Dumps in Johannesburg, Gauteng Province. Bloemfontein.

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Butler, E. 2018. Proposed Kalabasfontein Mine Extension project, near Bethal, Govan Mbeki District Municipality, Mpumalanga. Bloemfontein.

Butler, E. 2018. Palaeontological Desktop Assessment for the development of the proposed Leslie 1 Mining Project near Leandra, Mpumalanga Province. Bloemfontein.

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Butler, E. 2018. Environmental Impact Assessment (EIA) for the Proposed 325mw Rondekop Wind Energy Facility between Matjiesfontein And Sutherland In The Northern Cape Province.

Butler, E. 2018. Palaeontological Impact Assessment of the proposed construction of the Tooverberg Wind Energy Facility, and associated grid connection near Touws River in the Western Cape Province. Bloemfontein.

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- E. Butler.** 2019. Palaeontological Field Assessment for Heuningspruit PV 1 Solar Energy Facility near Koppies, Ngwathe Local Municipality, Free State Province.
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- E. Butler.** 2019. Recommended Exemption from further Palaeontological studies for the Proposed Agricultural Development on Farms 1763, 2372 And 2363, Kakamas South Settlement, Kai! Garib Municipality, Mgcawu District Municipality, Northern Cape Province.
- E. Butler. 2019.** Recommended Exemption from further Palaeontological studies: of Proposed Agricultural Development, Plot 1178, Kakamas South Settlement, Kai! Garib Municipality
- E. Butler. 2019.** Palaeontological Desktop Assessment for the Proposed Waste Rock Dump Project at Tshipi Borwa Mine, near Hotazel, Northern Cape Province:
- E. Butler. 2019.** Palaeontological Exemption Letter for the proposed DMS Upgrade Project at the Sishen Mine, Gamagara Local Municipality, Northern Cape Province
- E. Butler. 2019.** Palaeontological Desktop Assessment of the proposed Integrated Environmental Authorisation process for the proposed Der Brochen Amendment project, near Groblershoop, Limpopo
- E. Butler. 2019.** Palaeontological Desktop Assessment of the proposed updated Environmental Management Programme (EMPr) for the Assmang (Pty) Ltd Black Rock Mining Operations, Hotazel, Northern Cape
- E. Butler. 2019.** Palaeontological Desktop Assessment of the proposed Kriel Power Station Lime Plant Upgrade, Mpumalanga Province
- E. Butler. 2019.** Palaeontological Impact Assessment for the proposed Kangala Extension Project Near Delmas, Mpumalanga Province.
- E. Butler. 2019.** Palaeontological Desktop Assessment for the proposed construction of an iron/steel smelter at the Botshabelo Industrial area within the Mangaung Metropolitan Municipality, Free State Province.
- E. Butler. 2019.** Recommended Exemption from further Palaeontological studies for the proposed agricultural development on farms 1763, 2372 and 2363, Kakamas South settlement, Kai! Garib Municipality, Mgcawu District Municipality, Northern Cape Province.
- E. Butler. 2019.** Recommended Exemption from further Palaeontological Studies for Proposed formalisation of Gamakor and Noodkamp low cost Housing Development, Keimoes, Gordonia Rd, Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province.
- E. Butler. 2019.** Recommended Exemption from further Palaeontological Studies for proposed formalisation of Blaauwskop Low Cost Housing Development, Kenhardt Road, Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province.
- E. Butler. 2019.** Palaeontological Desktop Assessment of the proposed mining permit application for the removal of diamonds alluvial and diamonds kimberlite near Windsorton on a certain portion of Farm Zoelen's Laagte 158, Registration Division: Barkly Wes, Northern Cape Province.
- E. Butler. 2019.** Palaeontological Desktop Assessment of the proposed Vedanta Housing Development, Pella Mission 39, Khâi-Ma Local Municipality, Namakwa District Municipality, Northern Cape.
- E. Butler. 2019.** Palaeontological Desktop Assessment for The Proposed 920 Kwp Groenheuwel Solar Plant Near Augrabies, Northern Cape Province
- E. Butler. 2019.** Palaeontological Desktop Assessment for the establishment of a Super Fines Storage Facility at Amandelbult Mine, Near Thabazimbi, Limpopo Province
- E. Butler. 2019.** Palaeontological Impact Assessment for the proposed Sace Lifex Project, Near Emalahleni, Mpumalanga Province

- E. Butler. 2019.** Palaeontological Desktop Assessment for the proposed Rehau Fort Jackson Warehouse Extension, East London
- E. Butler. 2019.** Palaeontological Desktop Assessment for the proposed Environmental Authorisation Amendment for moving 3 Km Of the Merensky-Kameni 132KV Powerline
- E. Butler. 2019.** Palaeontological Impact Assessment for the proposed Umsobomvu Solar PV Energy Facilities, Northern and Eastern Cape
- E. Butler. 2019.** Palaeontological Desktop Assessment for six proposed Black Mountain Mining Prospecting Right Applications, without Bulk Sampling, in the Northern Cape.
- E. Butler. 2019.** Palaeontological field Assessment of the Filling Station (Rietvlei Extension 6) on the Remaining Portion of Portion 1 of the Farm Witkoppies 393JR east of the Rietvleidam Nature Reserve, City of Tshwane, Gauteng
- E. Butler. 2019.** Palaeontological Desktop Assessment Of The Proposed Upgrade Of The Vaal Gamagara Regional Water Supply Scheme: Phase 2 And Groundwater Abstraction
- E. Butler. 2019.** Palaeontological Desktop Assessment Of The Expansion Of The Jan Kempdorp Cemetry On Portion 43 Of Farm Guldenskat 36-Hn, Northern Cape Province
- E. Butler. 2019.** Palaeontological Desktop Assessment of the Proposed Residential Development On Portion 42 Of Farm Geldunskat No 36 In Jan Kempdorp, Phokwane Local Municipality, Northern Cape Province
- E. Butler. 2019.** Palaeontological Impact Assessment of the proposed new Township Development, Lethabo Park, on Remainder of Farm Roodepan No 70, Erf 17725 And Erf 15089, Roodepan Kimberley, Sol Plaatjies Local Municipality, Frances Baard District Municipality, Northern Cape
- E. Butler. 2019.** Palaeontological Protocol for Finds for the proposed 16m WH Battery Storage System in Steinkopf, Northern Cape Province
- E. Butler. 2019.** Palaeontological Exemption Letter of the proposed 4.5WH Battery Storage System near Midway-Pofadder, Northern Cape Province
- E. Butler. 2019.** Palaeontological Exemption Letter of the proposed 2.5ml Process Water Reservoir at Gloria Mine, Black Rock, Hotazel, Northern Cape
- E. Butler. 2019.** Palaeontological Desktop Assessment for the Establishment of a Super Fines Storage Facility at Gloria Mine, Black Rock Mine Operations, Hotazel, Northern Cape:
- E. Butler. 2019.** Palaeontological Desktop Assessment for the Proposed New Railway Bridge, and Rail Line Between Hotazel And The Gloria Mine, Northern Cape Province
- E. Butler. 2019.** Palaeontological Exemption Letter Of The Proposed Mixed Use Commercial Development On Portion 17 Of Farm Boegoeberg Settlement Number 48, !Kheis Local Municipality In The Northern Cape Province
- E. Butler. 2019.** Palaeontological Desktop Assessment of the Proposed Diamond Mining Permit Application Near Kimberley, Sol Plaatjies Municipality, Northern Cape Province
- E. Butler. 2019.** Palaeontological Desktop Assessment of the Proposed Diamonds (Alluvial, General & In Kimberlite) Prospecting Right Application near Postmasburg, Registration Division; Hay, Northern Cape Province
- E. Butler. 2019.** Palaeontological Desktop Assessment of the proposed diamonds (alluvial, general & in kimberlite) prospecting right application near Kimberley, Northern Cape Province.
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- E. Butler. 2019.** Palaeontological Desktop Assessment of the proposed seepage interception drains at Duvha Power Station, Emalahleni Municipality, Mpumalanga Province
- E. Butler. 2019.** Palaeontological Desktop Assessment letter for the Proposed PV Solar Facility at the Heineken Sedibeng Brewery, near Vereeniging, Gauteng.

- E. Butler.** 2019. Palaeontological Phase 1 Assessment letter for the Proposed PV Solar Facility at the Heineken Sedibeng Brewery, near Vereeniging, Gauteng.
- E. Butler.** 2019. Palaeontological field Assessment for the Proposed Upgrade of the Kolomela Mining Operations, Tsantsabane Local Municipality, Siyanda District Municipality, Northern Cape Province, Northern Cape
- E. Butler.** 2019. Palaeontological Desktop Assessment of the proposed feldspar prospecting rights and mining application on portion 4 and 5 of the farm Rozynen 104, Kakamas South, Kai! Garib Municipality, Zf Mgcawu District Municipality, Northern Cape
- E. Butler.** 2019. Palaeontological Phase 1 Field Assessment of the proposed Summerpride Residential Development and Associated Infrastructure on Erf 107, Buffalo City Municipality, East London.
- E. Butler.** 2019. Palaeontological Desktop Impact Assessment for the proposed re-commission of the Old Balgray Colliery near Dundee, Kwazulu Natal.
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- E. Butler.** 2019. Palaeontological Desktop Assessment for the Proposed Environmental Authorisation and Amendment Processes for Elandsfontein Colliery.
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- E. Butler.** 2019. Palaeontological Field Assessment for the Proposed Nigel Gas Transmission Pipeline Project in the Nigel Area of the Ekurhuleni Metropolitan Municipality, Gauteng Province
- E. Butler.** 2019. Palaeontological Desktop Assessment for five Proposed Black Mountain Mining Prospecting Right Applications, Without Bulk Sampling, in the Northern Cape.
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- E. Butler.** 2019. Palaeontological Impact Assessment for the Proposed Sace Lifex Project, near Emalahleni, Mpumalanga Province.
- E. Butler.** 2019. Palaeontological Desktop Assessment for the proposed Golfview Colliery near Ermelo, Msukaligwa Local Municipality, Mpumalanga Province
- E. Butler.** 2019. Palaeontological Desktop Assessment for the Proposed Kangra Maquasa Block C Mining development near Piet Retief, in the Mkhondo Local Municipality within the Gert Sibande District Municipality
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- E. Butler.** 2020. Palaeontological Desktop Assessment for the Proposed Extension of the South African Nuclear Energy Corporation (Necsa) Pipe Storage Facility, Madibeng Local Municipality, North West Province
- E. Butler.** 2020. Palaeontological Field Assessment for the Proposed Piggery on Portion 46 of the Farm Brakkefontien 416, Within the Nelson Mandela Bay Municipality, Eastern Cape

- E. Butler.** 2020. Palaeontological field Assessment for the proposed Rietfontein Housing Project as part of the Rapid Land Release Programme, Gauteng Province Department of Human Settlements, City of Johannesburg Metropolitan Municipality
- E. Butler.** 2020. Palaeontological Desktop Assessment for the Proposed Choje Wind Farm between Grahamstown and Somerset East, Eastern Cape
- E. Butler.** 2020. Palaeontological Desktop Assessment of the Proposed Prospecting Right Application for the Prospecting of Diamonds (Alluvial, General & In Kimberlite), Combined with A Waste License Application, Registration Division: Gordonia And Kenhardt, Northern Cape Province
- E. Butler.** 2020. Palaeontological Impact Assessment for the Proposed Clayville Truck Yard, Ablution Blocks and Wash Bay to be Situated on Portion 55 And 56 Of Erf 1015, Clayville X11, Ekurhuleni Metropolitan Municipality, Gauteng Province
- E. Butler.** 2020. Palaeontological Desktop Assessment for the Proposed Hartebeesthoek Residential Development
- E. Butler.** 2020. Palaeontological Desktop Assessment for the Proposed Mooiplaats Educational Facility, Gauteng Province
- E. Butler.** 2020. Palaeontological Impact Assessment for the Proposed Monument Park Student Housing Establishment
- E. Butler.** 2020. Palaeontological Field Assessment for the Proposed Standerton X10 Residential and Mixed-Use Developments, Lekwa Local Municipality Standerton, Mpumalanga Province
- E. Butler.** 2020. Palaeontological Field Assessment for the Rezoning and Subdivision of Portion 6 Of Farm 743, East London
- E. Butler.** 2020. Palaeontological Field Assessment for the Proposed Matla Power Station Reverse Osmosis Plant, Mpumalanga Province

CONFERENCE CONTRIBUTIONS

NATIONAL

PRESENTATION

Butler, E., Botha-Brink, J., and F. Abdala. A new gorgonopsian from the uppermost *Dicynodon Assemblage Zone*, Karoo Basin of South Africa. 18th Biennial conference of the PSSA 2014. Wits, Johannesburg, South Africa.

International

Attended the Society of Vertebrate Palaeontology 73th Conference in Los Angeles, America. October 2012.

CONFERENCES: POSTER PRESENTATION

NATIONAL

Butler, E., and J. Botha-Brink. Cranial skeleton of *Galesaurus planiceps*, implications for biology and lifestyle. University of the Free State Seminar Day, Bloemfontein. South Africa. November 2007.

Butler, E., and J. Botha-Brink. Postcranial skeleton of *Galesaurus planiceps*, implications for biology and lifestyle. 14th Conference of the PSSA, Matjiesfontein, South Africa. September 2008:

Butler, E., and J. Botha-Brink. The biology of the South African non-mammaliaform cynodont *Galesaurus planiceps*. 15th Conference of the PSSA, Howick, South Africa. August 2008.

INTERNATIONAL VISITS

Natural History Museum, London

July 2008



Appendix D

Terms of Reference (Tor) for Specialist Studies

TERMS OF REFERENCE (ToR) FOR SPECIALIST STUDIES

PROPOSED DEVELOPMENT OF THE 9.9MW WILDEBEESTKUIL 1 SOLAR PHOTOVOLTAIC (PV) PLANT, 132kV POWER LINE AND ASSOCIATED INFRASTRUCTURE NEAR LEEUDORINGSTAD IN THE NORTH WEST PROVINCE, MAQUASSI HILLS LOCAL MUNICIPALITY IN THE DR KENNETH KAUNDA DISTRICT MUNICIPALITY

TERMS OF REFERENCE (ToR) FOR SPECIALIST STUDIES

2 INTRODUCTION

The purpose of the Terms of Reference (ToR) is to provide the specialist team with a consistent approach to the specialist studies that are required as part of the Basic Assessment (BA) process being conducted in respect of the proposed solar photovoltaic (PV) plant and associated power line development. This will enable comparison of environmental impacts, efficient review, and collation of the specialist studies into the BA report, in accordance with the latest requirements of the EIA Regulations, 2014 (as amended).

3 PROCESS

In terms of the Environmental Impact Assessment (EIA) Regulations, which were published on 04 December 2014 and amended on 07 April 2017 [promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017], various aspects of the proposed development are considered listed activities under GNR 327 and GNR 324 (this project is considered a BA process due to energy capacity thresholds of under 20MW and vegetation clearance thresholds of under 20ha), which may have an impact on the environment and therefore require authorisation from the provincial competent authority, namely the North West Department of Economic Development, Environment, Conservation and Tourism (NW DEDECT), prior to the commencement of such activities.

4 PROJECT DESCRIPTION

4.1 Project history

The original BA process for the proposed Wildebeestkuil PV Generation (Pty) Ltd (hereafter referred to as “Wildebeestkuil PV Generation”) solar photovoltaic (PV) plant was initiated in August 2016. All specialist studies were undertaken and subsequently all site sensitivities were identified. The specialist studies and draft basic assessment reports (DBARs) were completed and released for 30-day public review. The BA was however put out on hold prior to submitting the final basic assessment reports (FBARs) to the Department of Environmental Affairs (DEA). In February 2017, the proposed capacity and layout of the solar PV plant was

amended, and a new connection point and associated power line corridors were assessed. However, the project was put on hold prior to submitting the application forms to the DEA or commencing with the legislated public participation process. In August of 2020, Wildebeestkuil PV Generation proposed an additional 9.9MW PV plant on the Wildebeestkuil site (now referred to as the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line) outside of all site sensitivities that were identified in 2016, and as such specialist studies have been commissioned to assess and verify the now two (2) solar PV plants and 132kV power lines under the new Gazetted specialist protocols⁸.

4.2 Project location

Wildebeestkuil PV Generation is proposing to construct a solar PV plant, 132kV power line and associated infrastructure approximately 4km east of the town of Leeudoringstad in the Maquassi Hills Local Municipality, which falls within the Dr Kenneth Kaunda District Municipality in the North West Province of South Africa (hereafter referred to as the “proposed development”) (Department Ref No.: To be Allocated). The proposed development will have a total maximum generation capacity of up to approximately 9.9 megawatt (MW) and will be referred to as the Wildebeestkuil 1 Solar PV Plant and 132kV Power Line. SiVEST Environmental Division (hereafter referred to as “SiVEST”) has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the BA process for the proposed construction of the Wildebeestkuil 1 Solar PV Plant, 132kV power line and associated infrastructure. The overall objective of the solar PV plants and power lines is to generate electricity (by capturing solar energy) to feed into the national electricity grid and “wheel” the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a National Energy Regulator of South Africa (NERSA)-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

The proposed solar PV plant will be located on the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;
- Portion 14 of the Farm Wildebeestkuil No. 59; and
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59.

The combined extent of the above-mentioned properties is approximately 115.5 hectares (ha). The proposed solar PV plant and associated infrastructure assessed as part of this BA will however only occupy a portion of the above-mentioned properties.

⁸ GOVERNMENT GAZETTE No. 43110, 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, 20 MARCH 2020.

In terms of sections 24(5)(a), (h) and 44 of the National Environmental Management Act, 1998, prescribe general requirements for undertaking site sensitivity verification and for protocols for the assessment and minimum report content requirements of environmental impacts for environmental themes for activities requiring environmental authorisation, as contained in the Schedule hereto. When the requirements of a protocol apply, the requirements of Appendix 6 of the Environmental Impact Assessment Regulations, as amended, (EIA Regulations), promulgated under sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), are replaced by these requirements. Each protocol applies exclusively to the environmental theme identified within its scope. Multiple themes may apply to a single application for environmental authorisation, and assessments for these themes must be undertaken in accordance with the relevant protocol, or where no specific protocol has been prescribed, in accordance with the requirements of the EIA Regulations.

The power line corridor alternatives associated with each proposed solar PV plant which were assessed as part of the respective BA processes traverse the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;
- Portion 14 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 5 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 7 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 29 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59;
- Portion 35 of the Farm Leeuwbosch No. 44;
- Portion 36 of the Farm Leeuwbosch No. 44;
- Portion 37 of the Farm Leeuwbosch No. 44; and
- Portion 38 of the Farm Leeuwbosch No. 44.

The proposed development is located directly west of the Harvard Substation, where the current supply of electricity for the local areas and businesses is extracted from.

4.3 Solar PV Plant Components

The key components to be constructed are listed below:

- Solar PV field (arrays) comprising multiple PV modules.
- PV panel mountings. PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology.
- Each PV module will be approximately 2.5m long and 1.2m wide and mounted on supporting structures above ground. The final design details will become available during the detailed design phase of the proposed development, prior to the start of construction.
- The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed development.

In addition, related infrastructure required are:

- Underground cabling ($\approx 0.8\text{m} \times 0.6$ wide)
- Permanent Guard House ($\approx 876\text{m}^2$)
- Temporary building zone ($\approx 2994\text{m}^2$)
- Switching Substation ($\approx 2000\text{m}^2$)
- Internal gravel roads ($\approx 3.5\text{m}$ width)
- Upgrade to existing roads; and
- Site fencing ($\approx 2.1\text{m}$ high)

In addition to the above, the electricity generated by the proposed solar PV plant will be fed into the national electricity grid via a 132kV power line, which will connect to the Leeudoringstad Solar Plant Substation (part of a separate BA process)⁹. The proposed 132kV power line will consist of a series of towers anticipated to be located approximately 200m to 250m apart at this stage. The type of power line towers will be determined during the final design stages of the proposed development, prior to construction commencing. The height

⁹ Proposed Leeudoringstad Solar Plant Substation part of separate BA process and will be authorised under a separate EA.

will vary based on the terrain, but will ensure minimum overhead line (OHL) line clearances with buildings and surrounding infrastructure. The exact location of the towers will be determined during the final design stages of the proposed development.

For the purpose of this BA, corridors between approximately 60m and 150m wide were assessed for the proposed power line corridor route alternatives (see **Section 4** below). This is to allow for flexibility to route the power lines within the assessed corridors. As such, the selected preferred power lines will be routed within the assessed corridors. The final servitudes will be routed within the power line corridors, and it is expected that the servitude will not exceed 32m.

Once fully developed, the intention is to generate electricity (by capturing solar energy) to feed into the national electricity grid and “wheel” the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a NERSA-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

The construction phase will be between 12 and 24 months and the operational lifespan will be approximately 20 years, depending on the length of the power purchase agreement with the relevant off taker.

5 BA ALTERNATIVES

5.1 Location alternatives

No site alternatives for the proposed developments are being considered as the placement of solar PV installations and power lines is dependent on several factors, all of which are favourable at the proposed site location. This included land availability and topography, environmental sensitivities, distance to the national grid, solar resource site accessibility and current land use.

5.2 Technology alternatives

No other activity / technology alternatives are being considered. Renewable energy development in South Africa is highly desirable from a social, environmental and development point of view. Based on the flat terrain, the climatic conditions and current land use being agricultural, it was determined that the proposed site would be best-suited for a solar PV plant and associated power line, instead of any other type of renewable energy technology. It is generally preferred to install wind energy facilities (WEFs) on elevated ground. In addition, concentrated solar power (CSP) installations are not feasible because they have a high water requirement and the project site is located in a relatively arid area. There is also not enough rainfall in the area to justify a hydro-electric plant. Therefore, the only feasible technology alternative on this site is solar PV with associated power line, and as such this is the only technology alternative being considered.

5.3 Layout alternatives

No design or layout alternatives for the PV development area, Switching Substation, Guard house and Temporary Building Zone (and all other associated infrastructure) are being considered or assessed as part of the current BA process. Design and layout alternatives were considered and assessed as part of a previous BA process that was never completed, and as such the PV development area, Switching Substation, Guard house and Temporary Building Zone (and all other associated infrastructure) have been placed to avoid site sensitivities identified as part of a previous BA process as well as the current BA process. Specialist studies

were originally undertaken in 2016 and all current layouts and/or positions being proposed were selected based on the environmental sensitivities identified as part of these studies in 2016. All specialist studies which were undertaken in 2016 were however updated in 2020 (including ground-truthing, where required) to focus on the impacts of the layout being proposed as part of the current project. The results of the updated specialist assessments have informed the layout being proposed as part of the current BA process. The proposed layout has therefore been informed by the identified environmental sensitive and/or “no-go” areas.

Three (3) power line corridor route alternatives for the proposed 132kV power line were however identified and assessed by the respective specialists as part of the current BA process. These alternatives essentially provide for different power line route alignments contained within an assessment corridor. The power line corridor route alternatives were informed by the identified environmental sensitive and/or “no-go” areas. The various power line corridor alternatives are described in **Section 5.10** below.

5.4 The operational aspects of the activity

No operational alternatives were assessed in the BA, as none are available for solar PV installations and power lines.

5.5 ‘No-go’ alternative

The “no-go” alternative is the option of not fulfilling the proposed project. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the “no-go” option would entail no development.

The “no-go” option is a feasible option; however, this would prevent the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

6 SPECIALIST REPORT REQUIREMENTS

The specialist assessments should include the following sections:

6.1 Project Description

The specialist report must include the project description as provided above.

6.2 Terms of Reference (ToR)

The specialist report must include an explanation of the Terms of Reference (ToR) applicable to the specialist study. In addition, a table must be provided at the beginning of the specialist report listing the requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended) and cross referencing these requirements with the relevant sections in the report. An MS Word version of this table will be provided by SIVEST.

6.3 Legal Requirements and Guidelines

The specialist report must include a thorough overview of all applicable best practice guidelines, relevant legislation and authority requirements.

6.4 Methodology

The report must include a description of the methodology applied in carrying out the specialist assessment.

6.5 Specialist Findings / Identification of Impacts

The report must present the findings of the specialist studies and explain the implications of these findings for the proposed development (e.g. permits, licenses etc.). This section of the report should also identify any sensitive and/or 'no-go' areas on the development site which should be avoided.

The reports should be accompanied with spatial datasets (shapefiles, KML) and accompanying text documents if required.

6.6 Impact Rating Methodology

The impacts of the proposed solar PV plant and 132kV power line (during the Construction, Operation and Decommissioning phases) are to be assessed and rated according to the methodology developed by SiVEST. Specialists will be required to make use of the impact rating matrix provided (in Excel format) for this purpose. Please note that the significance of Cumulative Impacts should also be rated in this section. Both the methodology and the rating matrix will be provided by SiVEST.

Please be advised that this section must include mitigation measures aimed at minimising the impact of the proposed development.

6.7 Input to The Environmental Management Program (EMPr)

The report must include a description of the key monitoring recommendations for each applicable mitigation measure identified for each phase of the proposed development for inclusion in the Environmental Management Program (EMPr) or Environmental Authorisation (EA).

Please make use the Impact Rating Table (in Excel format) provided for each of the phases (i.e. Design, Construction, Operation and Decommissioning).

6.8 Cumulative Impact Assessment

Cumulative impact assessments must be undertaken for the proposed solar PV plant in order to determine the cumulative impact that will materialise should other Renewable Energy Facilities (REFs) and large-scale industrial developments be constructed within 50km of the proposed development.

The cumulative impact assessment must contain the following:

- A cumulative environmental impact statement noting whether the overall impact is acceptable; and

- A review of the specialist reports undertaken for other REFs and an indication of how the recommendations, mitigation measures and conclusion of the studies have been considered.

In order to assist the specialists in this regard, SiVEST will provide the following documentation / data:

- A summary table listing all REFs identified within 50km of the proposed solar PV plant;
- A map showing the location of the identified REFs;
- KML files; and
- Relevant EIA / BA reports that could be obtained.

The list of renewable energy facilities that must be assessed as part of the cumulative impact will be provided.

6.9 “No-Go” Alternative

Consideration must be given to the “no-go” option in the BA process. The “no-go” option assumes that the site remains in its current state, i.e. there is no construction of a Solar PV Plant, 132kV power line and associated infrastructure in the proposed project area and the status quo would proceed.

6.10 Comparative Assessment of Alternatives

As mentioned, layout alternatives, which subsequently informed the area for the potential erection of PV panels for the proposed solar PV plant, were identified and comparatively assessed as part of the BA process undertaken in 2016. Specialist studies were originally undertaken in 2016 and all current layouts and/or positions being proposed were selected based on the environmental sensitivities identified as part of these studies in 2016. All specialist studies which were undertaken in 2016 were however updated in 2020 (including ground-truthing, where required) to focus on the impacts of the layout being proposed as part of the current project. The results of the updated specialist assessments have informed the layout being proposed as part of the current BA process.

As the positions of the proposed PV development area, Switching Substation, Guard house and Temporary Building Zone (as well as all other associated infrastructure) have already been determined taking the identified environmental sensitive and/or “no-go” areas into consideration, the specialist is to update the comparative assessment as per the latest table provided by SiVEST.

Three (3) power line corridor route alternatives for the proposed 132kV power line were however identified and assessed by the respective specialists as part of the current BA process. These alternatives essentially provide for different power line route alignments contained within an assessment corridor. The power line corridor route alternatives were informed by the identified environmental sensitive and/or “no-go” areas. The various power line corridor route alternatives are described below.

1) Power Line Corridor Option 1:

This involves an overhead power line which will run north of the R502, from the switching substation located within the Wildebeestkuil PV1 Solar PV Plant application site to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation (part of separate BA process), depending on the alternative chosen

as 'preferred' for the Leeudoringstad Solar Plant Substation site¹⁰. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil PV1 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

2) Power Line Corridor Option 2A:

This involves an overhead power line which will run south of the R502, from the switching substation located within the Wildebeestkuil PV1 Solar PV Plant application site to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation (part of separate BA process), depending on the alternative chosen as 'preferred' for the Leeudoringstad Solar Plant Substation site¹⁰. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil PV1 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

3) Power Line Corridor Option 2B:

This involves an underground power line which will run south of the R502, from the switching substation located within the Wildebeestkuil PV1 Solar PV Plant application site to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation (part of separate BA process), depending on the alternative chosen as 'preferred' for the Leeudoringstad Solar Plant Substation site¹⁰. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil PV1 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

The specialist is therefore also to undertake comparative assessment for the above-mentioned power line corridor alternatives as per the table provided by SiVEST.

Key

PREFERRED	The alternative will result in a low impact / reduce the impact / result in a positive impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Alternative	Preference	Reasons (incl. potential issues)
Power Line Corridor Route Alternative		
Option 1		
Option 2A		
Option 2B		

6.11 Conclusion / Impact Statement

The conclusion section of the specialist reports must include an Impact Statement, indicating whether any fatal flaws have been identified and ultimately whether the proposed development can be authorised or not (i.e. whether EA should be granted / issued or not).

¹⁰ 132kV power line corridor route associated with solar PV plant intrinsically linked to Leeudoringstad Solar Plant Substation site (part of separate on-going BA process). Leeudoringstad Solar Plant Substation site chosen as "preferred" by respective specialists as part of that separate BA process therefore informed connection point for power line corridor being proposed as part of this BA application.

6.12 Executive Summary

Specialists must provide an Executive Summary which summarises the findings of their report to allow for easy inclusion in the BA reports.

7 DELIVERABLES

All specialists will need to submit the following deliverables:

- 1 x Draft Specialist Report for inclusion in DBAR no later than 07 September 2020 and updated version based on EAP and applicant review no later than 11 September 2020;
- 1 x Final Specialist Report for inclusion in FBAR (should updates and/or revisions be required);
- A copy of the Specialist Declaration of Interest (DoI) form, containing original signatures. This form will be provided to the specialists. **Please note that the undertaking / affirmation under oath section of the report must be signed by a Commissioner of Oaths;** and
- All data relating to the studies, such as shape files, photos and maps (see **Section 7** below).

8 GENERAL SUBMISSION REQUIREMENTS

Please ensure that your specialist report includes the following:

- 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 authorisations;
- Provide a detailed description of all limitations to the studies. All specialist studies must be conducted in the correct season and providing that as a limitation will not be allowed;
- 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;
- Should a specialist recommend specific mitigation measures, these must be clearly indicated;
- Regarding cumulative impacts:
 - Clearly defined cumulative impacts and where possible the size of the identified impact must be quantified and indicated, i.e. hectares of cumulatively transformed land.
 - A detailed process flow 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.
 - Identified cumulative impacts associated with the proposed development must be rated with the significance rating methodology used in the process.
 - The significance rating must also inform the need and desirability of the proposed development.
 - A cumulative impact environmental statement on whether the proposed development must proceed.

- The report must in line with the DEA Screening Tool Specialist Theme Protocols (As gazetted 20 March 2020) if they apply. If they do not, the report must be written in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended);
- A table at the beginning of your report cross referencing how the requirements for specialist according to Appendix 6 of the EIA Regulations, 2014 (as amended) has been adhered to. An MS Word version will be provided;
- A thorough overview of all applicable legislation, policies, guidelines. etc.;
- Identification of sensitive and/or “no-go” areas to be avoided;
- 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 is allowed in the “no-go” areas;
- Should the specialist definition of “no-go” area differ from the Departments definition; this must be clearly indicated. The specialist must also indicate the “no-go” area's buffer if applicable;
- Recommend mitigation measures in order to minimise the impact of the proposed development;
- Provide implications of specialist findings for the proposed development (e.g. permits, licenses etc.);
- Specify if any further assessment will be required;
- Include an Impact Statement, concluding whether any fatal flaws have been identified and ultimately whether the proposed development can be authorised or not (i.e. whether EA should be granted / issued or not); and
- A copy of the Specialist Declaration of Interest (DoI) form, containing original signatures, must be appended to all Draft and Final Reports. This form will be provided to the specialists. **Please note that the undertaking / affirmation under oath section of the report must be signed by a Commissioner of Oaths.**

9 DEADLINES AND REPORT SUBMISSION

- Draft Specialist Report for inclusion in DBAR no later than 07 September 2020 and updated version based on EAP and applicant review no later than 11 September 2020.
- Any changes arising based on stakeholder engagement no later than 16 October 2020

10 REPORT / DATA FORMATS

- All specialist reports must be provided in MS Word format;
- Where maps have been inserted into the report, SiVEST will require a separate map set in PDF format for inclusion in our submission;
- Where figures and/or photos have been inserted into the report, SiVEST will require the original graphic in .jpg format for inclusion in our submission; and
- ***Delineated areas of sensitivity must be provided in either ESRI shape file format or Google Earth KML format. Sensitivity classes must be included in the attribute tables with a clear indication of which areas are “No-Go” areas.***

11 SPECIALIST SPECIFIC ISSUES

Heritage / Palaeontology

- Describe and map the heritage / palaeontological features of the site and surrounding area. This is to be based on desk-top reviews, fieldwork, available databases, and findings from other heritage / palaeontological studies in the area, where relevant. Include reference to the grade of heritage / palaeontological feature and any heritage / palaeontological status the feature may have been awarded;
- Assess the impacts and provide mitigation measures to include in the environmental management plan;
- Map heritage / palaeontological sensitivity for the site. Clearly show any “no-go” areas in terms of heritage (i.e. “very high” sensitivity) and provide recommended buffers or set-back distances;
- Identify and assess potential impacts from the project on the full scope of heritage features, including archaeology, palaeontology and the cultural-historical landscape, as required by heritage legislation;
- Liaise with the relevant authority in order to obtain a final comment in terms of section 38 pf the National Heritage Resources Act, 1999 (Act No. 25 of 1999), including Regulations issued thereunder, as necessary; and
- Load the relevant documents on the South African Heritage Resources Information System (SAHRIS) to obtain a comment from SAHRA.

**PROPOSED DEVELOPMENT OF THE 9.9MW WILDEBEESTKUIL 2
SOLAR PHOTOVOLTAIC (PV) PLANT, 132kV POWER LINE AND
ASSOCIATED INFRASTRUCTURE NEAR LEEUDORINGSTAD IN THE
NORTH WEST PROVINCE, MAQUASSI HILLS LOCAL MUNICIPALITY IN
THE DR KENNETH KAUNDA DISTRICT MUNICIPALITY**

TERMS OF REFERENCE (ToR) FOR SPECIALIST STUDIES

12 INTRODUCTION

The purpose of the Terms of Reference (ToR) is to provide the specialist team with a consistent approach to the specialist studies that are required as part of the Basic Assessment (BA) process being conducted in respect of the proposed solar photovoltaic (PV) plant and associated power line development. This will enable comparison of environmental impacts, efficient review, and collation of the specialist studies into the BA report, in accordance with the latest requirements of the EIA Regulations, 2014 (as amended).

13 PROCESS

In terms of the Environmental Impact Assessment (EIA) Regulations, which were published on 04 December 2014 and amended on 07 April 2017 [promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017], various aspects of the proposed development are considered listed activities under GNR 327 and GNR 324 (this project is considered a BA process due to energy capacity thresholds of under 20MW and vegetation clearance thresholds of under 20ha), which may have an impact on the environment and therefore require authorisation from the provincial competent authority, namely the North West Department of Economic Development, Environment, Conservation and Tourism (NW DEDECT), prior to the commencement of such activities.

14 PROJECT DESCRIPTION

14.1 Project history

The original BA process for the proposed Wildebeestkuil PV Generation (Pty) Ltd (hereafter referred to as “Wildebeestkuil PV Generation”) solar photovoltaic (PV) plant was initiated in August 2016. All specialist studies were undertaken and subsequently all site sensitivities were identified. The specialist studies and draft basic assessment reports (DBARs) were completed and released for 30-day public review. The BA was however put out on hold prior to submitting the final basic assessment reports (FBARs) to the Department of Environmental Affairs (DEA). In February 2017, the proposed capacity and layout of the solar PV plant was amended, and a new connection point and associated power line corridors were assessed. However, the project was put on hold prior to submitting the application forms to the DEA or commencing with the legislated public participation process. In August of 2020, Wildebeestkuil PV Generation proposed an additional 9.9MW

PV plant on the Wildebeestkuil site (now referred to as the Wildebeestkuil 1 Solar PV Plant & 132kV Power Line and Wildebeestkuil 2 Solar PV Plant & 132kV Power Line) outside of all site sensitivities that were identified in 2016, and as such specialist studies have been commissioned to assess and verify the now two (2) solar PV plants and 132kV power lines under the new Gazetted specialist protocols¹¹.

14.2 Project location

Wildebeestkuil PV Generation is proposing to construct a solar PV plant, 132kV power line and associated infrastructure approximately 4km east of the town of Leeudoringstad in the Maquassi Hills Local Municipality, which falls within the Dr Kenneth Kaunda District Municipality in the North West Province of South Africa (hereafter referred to as the “proposed development”) (Department Ref No.: To be Allocated). The proposed development will have a total maximum generation capacity of up to approximately 9.9 megawatt (MW) and will be referred to as the Wildebeestkuil 2 Solar PV Plant and 132kV Power Line. SiVEST Environmental Division (hereafter referred to as “SiVEST”) has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the BA process for the proposed construction of the Wildebeestkuil 2 Solar PV Plant, 132kV power line and associated infrastructure. The overall objective of the solar PV plants and power lines is to generate electricity (by capturing solar energy) to feed into the national electricity grid and “wheel” the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a National Energy Regulator of South Africa (NERSA)-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

The proposed solar PV plant will be located on the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;
- Portion 14 of the Farm Wildebeestkuil No. 59; and
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59.

The combined extent of the above-mentioned properties is approximately 115.5 hectares (ha). The proposed solar PV plant and associated infrastructure assessed as part of this BA will however only occupy a portion of the above-mentioned properties.

The power line corridor alternatives associated with each proposed solar PV plant which were assessed as part of the respective BA processes traverse the following properties:

- Portion 13 of the Farm Wildebeestkuil No. 59;

¹¹ GOVERNMENT GAZETTE No. 43110, 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, 20 MARCH 2020.

In terms of sections 24(5)(a), (h) and 44 of the National Environmental Management Act, 1998, prescribe general requirements for undertaking site sensitivity verification and for protocols for the assessment and minimum report content requirements of environmental impacts for environmental themes for activities requiring environmental authorisation, as contained in the Schedule hereto. When the requirements of a protocol apply, the requirements of Appendix 6 of the Environmental Impact Assessment Regulations, as amended, (EIA Regulations), promulgated under sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), are replaced by these requirements. Each protocol applies exclusively to the environmental theme identified within its scope. Multiple themes may apply to a single application for environmental authorisation, and assessments for these themes must be undertaken in accordance with the relevant protocol, or where no specific protocol has been prescribed, in accordance with the requirements of the EIA Regulations.

- Portion 14 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 5 of the Farm Wildebeestkuil No. 59;
- Remainder of Portion 7 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 29 of the Farm Leeuwbosch No. 44;
- Remainder of Portion 22 of the Farm Wildebeestkuil No. 59;
- Portion 35 of the Farm Leeuwbosch No. 44;
- Portion 36 of the Farm Leeuwbosch No. 44;
- Portion 37 of the Farm Leeuwbosch No. 44; and
- Portion 38 of the Farm Leeuwbosch No. 44.

The proposed development is located directly west of the Harvard Substation, where the current supply of electricity for the local areas and businesses is extracted from.

14.3 Solar PV Plant Components

The key components to be constructed are listed below:

- Solar PV field (arrays) comprising multiple PV modules.
- PV panel mountings. PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology.
- Each PV module will be approximately 2.5m long and 1.2m wide and mounted on supporting structures above ground. The final design details will become available during the detailed design phase of the proposed development, prior to the start of construction.
- The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed development.

In addition, related infrastructure required are:

- Underground cabling ($\approx 0.8\text{m} \times 0.6$ wide)
- Permanent Guard House ($\approx 876\text{m}^2$)
- Temporary building zone ($\approx 2994\text{m}^2$)
- Switching Substation ($\approx 2000\text{m}^2$)
- Internal gravel roads ($\approx 3.5\text{m}$ width)
- Upgrade to existing roads; and
- Site fencing ($\approx 2.1\text{m}$ high)

In addition to the above, the electricity generated by the proposed solar PV plant will be fed into the national electricity grid via a 132kV power line, which will connect to the Leeudoringstad Solar Plant Substation (part of a separate BA process)¹². The proposed 132kV power line will consist of a series of towers anticipated to be located approximately 200m to 250m apart at this stage. The type of power line towers will be determined during the final design stages of the proposed development, prior to construction commencing. The height will vary based on the terrain, but will ensure minimum overhead line (OHL) line clearances with buildings and surrounding infrastructure. The exact location of the towers will be determined during the final design stages of the proposed development.

¹² Proposed Leeudoringstad Solar Plant Substation part of separate BA process and will be authorised under a separate EA.

For the purpose of this BA, corridors between approximately 60m and 150m wide were assessed for the proposed power line corridor route alternatives (see **Section 4** below). This is to allow for flexibility to route the power lines within the assessed corridors. As such, the selected preferred power lines will be routed within the assessed corridors. The final servitudes will be routed within the power line corridors, and it is expected that the servitude will not exceed 32m.

Once fully developed, the intention is to generate electricity (by capturing solar energy) to feed into the national electricity grid and “wheel” the power to customers based on a power purchase agreement. Additionally, an agreement is in place to sell the energy to PowerX, who hold a NERSA-issued electricity trading license which allows them to purchase energy generated from clean and renewable resources and sell it to its customers.

The construction phase will be between 12 and 24 months and the operational lifespan will be approximately 20 years, depending on the length of the power purchase agreement with the relevant off taker.

15 BA ALTERNATIVES

15.1 Location alternatives

No site alternatives for the proposed developments are being considered as the placement of solar PV installations and power lines is dependent on several factors, all of which are favourable at the proposed site location. This included land availability and topography, environmental sensitivities, distance to the national grid, solar resource site accessibility and current land use.

15.2 Technology alternatives

No other activity / technology alternatives are being considered. Renewable energy development in South Africa is highly desirable from a social, environmental and development point of view. Based on the flat terrain, the climatic conditions and current land use being agricultural, it was determined that the proposed site would be best-suited for a solar PV plant and associated power line, instead of any other type of renewable energy technology. It is generally preferred to install wind energy facilities (WEFs) on elevated ground. In addition, concentrated solar power (CSP) installations are not feasible because they have a high water requirement and the project site is located in a relatively arid area. There is also not enough rainfall in the area to justify a hydro-electric plant. Therefore, the only feasible technology alternative on this site is solar PV with associated power line, and as such this is the only technology alternative being considered.

15.3 Layout alternatives

No design or layout alternatives for the PV development area, Switching Substation, Guard house and Temporary Building Zone (and all other associated infrastructure) are being considered or assessed as part of the current BA process. Design and layout alternatives were considered and assessed as part of a previous BA process that was never completed, and as such the PV development area, Switching Substation, Guard house and Temporary Building Zone (and all other associated infrastructure) have been placed to avoid site sensitivities identified as part of a previous BA process as well as the current BA process. Specialist studies were originally undertaken in 2016 and all current layouts and/or positions being proposed were selected based on the environmental sensitivities identified as part of these studies in 2016. All specialist studies which were undertaken in 2016 were however updated in 2020 (including ground-truthing, where required) to focus on the impacts of the layout being proposed as part of the current project. The results of the updated specialist

assessments have informed the layout being proposed as part of the current BA process. The proposed layout has therefore been informed by the identified environmental sensitive and/or “no-go” areas.

Three (3) power line corridor route alternatives for the proposed 132kV power line were however identified and assessed by the respective specialists as part of the current BA process. These alternatives essentially provide for different power line route alignments contained within an assessment corridor. The power line corridor route alternatives were informed by the identified environmental sensitive and/or “no-go” areas. The various power line corridor alternatives are described in **Section 5.10** below.

15.4 The operational aspects of the activity

No operational alternatives were assessed in the BA, as none are available for solar PV installations and power lines.

15.5 ‘No-go’ alternative

The “no-go” alternative is the option of not fulfilling the proposed project. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the “no-go” option would entail no development.

The “no-go” option is a feasible option; however, this would prevent the Wildebeestkuil 2 Solar PV Plant & 132kV Power Line from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

16 SPECIALIST REPORT REQUIREMENTS

The specialist assessments should include the following sections:

16.1 Project Description

The specialist report must include the project description as provided above.

16.2 Terms of Reference (ToR)

The specialist report must include an explanation of the Terms of Reference (ToR) applicable to the specialist study. In addition, a table must be provided at the beginning of the specialist report listing the requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended) and cross referencing these requirements with the relevant sections in the report. An MS Word version of this table will be provided by SIVEST.

16.3 Legal Requirements and Guidelines

The specialist report must include a thorough overview of all applicable best practice guidelines, relevant legislation and authority requirements.

16.4 Methodology

The report must include a description of the methodology applied in carrying out the specialist assessment.

16.5 Specialist Findings / Identification of Impacts

The report must present the findings of the specialist studies and explain the implications of these findings for the proposed development (e.g. permits, licenses etc.). This section of the report should also identify any sensitive and/or 'no-go' areas on the development site which should be avoided.

The reports should be accompanied with spatial datasets (shapefiles, KML) and accompanying text documents if required.

16.6 Impact Rating Methodology

The impacts of the proposed solar PV plant and 132kV power line (during the Construction, Operation and Decommissioning phases) are to be assessed and rated according to the methodology developed by SiVEST. Specialists will be required to make use of the impact rating matrix provided (in Excel format) for this purpose. Please note that the significance of Cumulative Impacts should also be rated in this section. Both the methodology and the rating matrix will be provided by SiVEST.

Please be advised that this section must include mitigation measures aimed at minimising the impact of the proposed development.

16.7 Input to The Environmental Management Program (EMPr)

The report must include a description of the key monitoring recommendations for each applicable mitigation measure identified for each phase of the proposed development for inclusion in the Environmental Management Program (EMPr) or Environmental Authorisation (EA).

Please make use the Impact Rating Table (in Excel format) provided for each of the phases (i.e. Design, Construction, Operation and Decommissioning).

16.8 Cumulative Impact Assessment

Cumulative impact assessments must be undertaken for the proposed solar PV plant in order to determine the cumulative impact that will materialise should other Renewable Energy Facilities (REFs) and large-scale industrial developments be constructed within 50km of the proposed development.

The cumulative impact assessment must contain the following:

- A cumulative environmental impact statement noting whether the overall impact is acceptable; and
- A review of the specialist reports undertaken for other REFs and an indication of how the recommendations, mitigation measures and conclusion of the studies have been considered.

In order to assist the specialists in this regard, SiVEST will provide the following documentation / data:

- A summary table listing all REFs identified within 50km of the proposed solar PV plant;
- A map showing the location of the identified REFs;

- KML files; and
- Relevant EIA / BA reports that could be obtained.

The list of renewable energy facilities that must be assessed as part of the cumulative impact will be provided.

16.9 “No-Go” Alternative

Consideration must be given to the “no-go” option in the BA process. The “no-go” option assumes that the site remains in its current state, i.e. there is no construction of a Solar PV Plant, 132kV power line and associated infrastructure in the proposed project area and the status quo would proceed.

16.10 Comparative Assessment of Alternatives

As mentioned, layout alternatives, which subsequently informed the area for the potential erection of PV panels for the proposed solar PV plant, were identified and comparatively assessed as part of the BA process undertaken in 2016. Specialist studies were originally undertaken in 2016 and all current layouts and/or positions being proposed were selected based on the environmental sensitivities identified as part of these studies in 2016. All specialist studies which were undertaken in 2016 were however updated in 2020 (including ground-truthing, where required) to focus on the impacts of the layout being proposed as part of the current project. The results of the updated specialist assessments have informed the layout being proposed as part of the current BA process.

As the positions of the proposed PV development area, Switching Substation, Guard house and Temporary Building Zone (as well as all other associated infrastructure) have already been determined taking the identified environmental sensitive and/or “no-go” areas into consideration, the specialist is to update the comparative assessment as per the latest table provided by SiVEST.

Three (3) power line corridor route alternatives for the proposed 132kV power line were however identified and assessed by the respective specialists as part of the current BA process. These alternatives essentially provide for different power line route alignments contained within an assessment corridor. The power line corridor route alternatives were informed by the identified environmental sensitive and/or “no-go” areas. The various power line corridor route alternatives are described below.

1) Power Line Corridor Option 1:

This involves an overhead power line which will run north of the R502, from the switching substation located within the Wildebeestkuil 2 Solar PV Plant application site (namely Portion 14 of the Farm Wildebeestkuil No. 59) to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation, depending on the alternative chosen as “preferred” for the Leeudoringstad Solar Plant Substation site¹³. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil 2 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

¹³ 132kV power line corridor route associated with solar PV plant intrinsically linked to Leeudoringstad Solar Plant Substation site (part of separate on-going BA process). Leeudoringstad Solar Plant Substation site chosen as “preferred” by respective specialists as part of that separate BA process therefore informed connection point for power line corridor being proposed as part of this BA application.

2) Power Line Corridor Option 2A:

This involves an overhead power line which will run south of the R502, from the switching substation located within the Wildebeestkuil 2 Solar PV Plant application site (namely Portion 14 of the Farm Wildebeestkuil No. 59) to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation, depending on the alternative chosen as “preferred” for the Leeudoringstad Solar Plant Substation site¹³. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil 2 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

3) Power Line Corridor Option 2B:

This involves an underground power line which will run south of the R502, from the switching substation located within the Wildebeestkuil 2 Solar PV Plant application site (namely Portion 14 of the Farm Wildebeestkuil No. 59) to either Option 1 or Option 2 of the Leeudoringstad Solar Plant Substation, depending on the alternative chosen as “preferred” for the Leeudoringstad Solar Plant Substation site¹³. The Leeudoringstad Solar Plant Substation site alternatives are situated approximately 2km to the north-east of the Wildebeestkuil 2 Solar PV Plant application site, within Portion 37 of the Farm Leeuwbosch No. 44.

The specialist is therefore also to undertake comparative assessment for the above-mentioned power line corridor alternatives as per the table provided by SiVEST.

Key

PREFERRED	The alternative will result in a low impact / reduce the impact / result in a positive impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Alternative	Preference	Reasons (incl. potential issues)
Power Line Corridor Route Alternative		
Option 1		
Option 2A		
Option 2B		

16.11 Conclusion / Impact Statement

The conclusion section of the specialist reports must include an Impact Statement, indicating whether any fatal flaws have been identified and ultimately whether the proposed development can be authorised or not (i.e. whether EA should be granted / issued or not).

16.12 Executive Summary

Specialists must provide an Executive Summary which summarises the findings of their report to allow for easy inclusion in the BA reports.

17 DELIVERABLES

All specialists will need to submit the following deliverables:

- 1 x Draft Specialist Report for inclusion in DBAR no later than 07 September 2020 and updated version based on EAP and applicant review no later than 11 September 2020;
- 1 x Final Specialist Report for inclusion in FBAR (should updates and/or revisions be required);
- A copy of the Specialist Declaration of Interest (DoI) form, containing original signatures. This form will be provided to the specialists. **Please note that the undertaking / affirmation under oath section of the report must be signed by a Commissioner of Oaths;** and
- All data relating to the studies, such as shape files, photos and maps (see **Section 7** below).

18 GENERAL SUBMISSION REQUIREMENTS

Please ensure that your specialist report includes the following:

- 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 authorisations;
- Provide a detailed description of all limitations to the studies. All specialist studies must be conducted in the correct season and providing that as a limitation will not be allowed;
- 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;
- Should a specialist recommend specific mitigation measures, these must be clearly indicated;
- Regarding cumulative impacts:
 - Clearly defined cumulative impacts and where possible the size of the identified impact must be quantified and indicated, i.e. hectares of cumulatively transformed land.
 - A detailed process flow 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.
 - Identified cumulative impacts associated with the proposed development must be rated with the significance rating methodology used in the process.
 - The significance rating must also inform the need and desirability of the proposed development.
 - A cumulative impact environmental statement on whether the proposed development must proceed.
- The report must in line with the DEA Screening Tool Specialist Theme Protocols (As gazetted 20 March 2020) if they apply. If they do not, the report must be written in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended);
- A table at the beginning of your report cross referencing how the requirements for specialist according to Appendix 6 of the EIA Regulations, 2014 (as amended) has been adhered to. An MS Word version will be provided;

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- 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 is allowed in the “no-go” areas;
- Should the specialist definition of “no-go” area differ from the Departments definition; this must be clearly indicated. The specialist must also indicate the “no-go” area's buffer if applicable;
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- Any changes arising based on stakeholder engagement no later than 16 October 2020

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- All specialist reports must be provided in MS Word format;
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- Where figures and/or photos have been inserted into the report, SiVEST will require the original graphic in .jpg format for inclusion in our submission; and
- ***Delineated areas of sensitivity must be provided in either ESRI shape file format or Google Earth KML format. Sensitivity classes must be included in the attribute tables with a clear indication of which areas are “No-Go” areas.***

21 SPECIALIST SPECIFIC ISSUES

Heritage / Palaeontology

- Describe and map the heritage / palaeontological features of the site and surrounding area. This is to be based on desk-top reviews, fieldwork, available databases, and findings from other heritage / palaeontological studies in the area, where relevant. Include reference to the grade of heritage /

palaeontological feature and any heritage / palaeontological status the feature may have been awarded;

- Assess the impacts and provide mitigation measures to include in the environmental management plan;
- Map heritage / palaeontological sensitivity for the site. Clearly show any “no-go” areas in terms of heritage (i.e. “very high” sensitivity) and provide recommended buffers or set-back distances;
- Identify and assess potential impacts from the project on the full scope of heritage features, including archaeology, palaeontology and the cultural-historical landscape, as required by heritage legislation;
- Liaise with the relevant authority in order to obtain a final comment in terms of section 38 pf the National Heritage Resources Act, 1999 (Act No. 25 of 1999), including Regulations issued thereunder, as necessary; and
- Load the relevant documents on the South African Heritage Resources Information System (SAHRIS) to obtain a comment from SAHRA.