PROPOSED 132KV/400KV ON-SITE MAIN TRANSMISSION SUBSTATION (MTS) AND ASSOCIATED INFRASTRUCTURE PROJECT NEAR DEALESVILLE

PALAEONTOLOGICAL IMPACT ASSESSMENT

DFFE Reference: To be Allocated

Report Prepared by: **Elize Butler (Banzai Environmental Pty Ltd)**

Issue Date: 27-10-2021

Version No.: 01

EXECUTIVE SUMMARY

Banzai Environmental has been appointed by SLR South Africa Consulting (PTY) Ltd, on behalf of South Africa Mainstream Renewable Power Developments (Pty) Ltd, hereafter referred to as "Mainstream", to undertake a Palaeontological Impact Assessment for the proposed for the proposed addition of one (1) Main Transmission Substation (MTS) and three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines) and Li-Ion Battery Energy Storage System to their authorised Kentani Cluster of solar photovoltaic (PV) developments near the town of Dealesville in the Free State Province (the 'proposed development'). The proposed development will also involve the re-routing of eight (8) 132 kilovolt (kV) powerlines within the grid connection corridor authorised as part of the Kentani Cluster and making provision for this routing in the new proposed MTS. The proposed development area falls within the Tokologo Local Municipality, within the Lejweleputswa District Municipality

The proposed Mainstream 132kV/400kV On-site MTS, BESS and associated infrastructure is underlain by Quaternary sediments mantling the Jurassic dolerite, and the Tierberg Formation of the Ecca Group (Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Quaternary superficial sediments is low but locally high, that of the Jurassic dolerite is Zero as it is igneous in origin, while the Tierberg Formation has a High Palaeontological Sensitivity (Almond and Pether, 2009; Almond *et al*., 2013).

A site-specific field survey of the proposed Mainstream electrical development was conducted on foot and by motor vehicle on 11 September and 27 October 2021. No visible evidence of fossiliferous outcrops was found. For this reason, an overall low palaeontological sensitivity is allocated to the development footprint. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the proposed electrical infrastructure will be of a low significance in palaeontological terms. It is therefore considered that the proposed development is feasible and will not lead to detrimental impacts on the palaeontological reserves of the area. The construction of the development may thus be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the ECO or site manager in charge of these developments. Fossil discoveries ought to be protected and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that suitable mitigation (recording and collection) can be carried out.

NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA) AND ENVIRONMENTAL IMPACT ASSESSMENT (EIA) 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 ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page vi Appendix 2
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page iv
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 2.3
(cA) an indication of the quality and age of base data used for the specialist report;	Section 5
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 7
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 9
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 2.3
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;	Section 5
g) an identification of any areas to be avoided, including buffers;	N/A

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;	Section 5
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 2.4
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;	Section 9
k) any mitigation measures for inclusion in the EMPr;	Section 8
l) any conditions for inclusion in the environmental authorisation;	Section 8
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
n) a reasoned opinion- 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;	Section 9
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	No
q) any other information requested by the competent authority.	No
2) Where a government notice *gazetted* 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.	Section 3

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

PROPOSED CONSTRUCTION AND OPERATION OF THE 132KV/400KV ON-SITE MAIN TRANSMISSION SUBSTATION (MTS) AND ASSOCIATED INFRASTRUCTURE LOCATED NEAR DEALESVILLE IN THE TOKOLOGO LOCAL MUNICIPALITY, LEJWELEPUTSWA DISTRICT IN THE FREE STATE PROVINCE

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:

Department of Environmental Affairs

Attention: Chief Director: Integrated Environmental Authorisations

Private Bag X447

Pretoria

0001

Physical address:

Department of Environmental Affairs

Attention: Chief Director: Integrated Environmental Authorisations

Environment House

473 Steve Biko Road

Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:

Email: EIAAdmin@environment.gov.za

SPECIALIST INFORMATION

Specialist Company Name:	Banzai Environmental Pry Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	Level four	Percentage Procurement recognition	51%
Specialist name:	Elize Butler			
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E-mail:	Elizebutler002@gmail.com			

DECLARATION BY THE SPECIALIST

I, Elize Butler, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and

- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

Banzai Environmental

Name of Company:

Date:

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GLOSSARY OF TERMS

Fossil

Mineralized bones of vertebrate and invertebrate animals, as well as plants. A trace fossil is the traces of animals/plants preserved in stone.

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 comprises of fossilised remains or traces of past life.

LIST OF ABBREVIATIONS

Abbreviations	Description
DEA	Department of Environmental Affairs
DEFF	Department of Environment, Forestry and Fisheries
DIA	Desktop Impact Assessment
EO	Environmental Officer
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
Ma	Million years ago
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PIA	Palaeontological Impact Assessment
PSSA	Palaeontological Society of South Africa
SAHRA	South African Heritage Resources Agency
ToR	Terms of Reference

1 INTRODUCTION

Banzai Environmental has been appointed by SLR South Africa Consulting (PTY) Ltd, on behalf of South Africa Mainstream Renewable Power Developments (Pty) Ltd, hereafter referred to as "Mainstream", to undertake a Palaeontological Impact Assessment for the proposed addition of one (1) Main Transmission Substation (MTS) and three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines) and Li-Ion Battery Energy Storage System to their authorised Kentani Cluster of solar photovoltaic (PV) developments near the town of Dealesville in the Free State Province (the 'proposed development'). The proposed development will also involve the re-routing of eight (8) 132 kilovolt (kV) powerlines within the grid connection corridor authorised as part of the Kentani Cluster and making provision for this routing in the new proposed MTS. The proposed development area falls within the Tokologo Local Municipality, within the Lejweleputswa District Municipality (refer to Figure 1).

It should be noted that on 28 October 2021, the Minister of Mineral Resources and Energy, Gwede Mantashe announced the Preferred Bidders of the Round 5 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and six (6) of the aforementioned Solar Energy Facilities received Preferred Bidder status i.e.:

- Kentani Solar PV
- Klipfontein Solar PV
- Klipfontein 2 Solar PV
- Leliehoek Solar PV
- Sonoblomo Solar PV
- Braklaagte Solar PV

These Solar Energy Facilities have now become Strategic Infrastructure Projects i.e. SIPs 8 and 10. SIPs 8 and 10 target the development of green energy in support of the South African economy and the provision of electricity transmission and distribution respectively.

- SIP 8 supports sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP2010) and support bio-fuel production facilities.
- SIP 10 Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity

The Kentani Cluster consists of eleven (11) solar PV projects and associated electrical infrastructure (including a powerline), each of which received their own Environmental Authorisation (EA) in 2016 from the Department of

Environmental Affairs (DEA) [now referred to as the Department of Forestry, Fisheries and the Environment (DFFE)][1]. The proposed MTS and associated infrastructure [i.e., eleven (11) powerlines] will service eleven (11) of Mainstream's solar PV projects authorised as part of the Kentani Cluster.

It should be noted that the proposed MTS and associated infrastructure will be located within the authorised Klipfontein PV facility (14/12/16/3/3/2/722). In addition, of the eleven (11) powerlines, eight (8) are 132kV powerlines which are located within the authorised corridor included as part of the authorised solar PV developments and require re-routing within the authorised corridor. The remaining powerlines [i.e., two (2) 400kV and one (1) 132kV powerlines] fall outside of the authorised corridor and therefore will be assessed as part of the Basic Assessment (BA) process for the MTS (i.e., this application).

In terms of the 2014 Environmental Impact Assessment (EIA) Regulations (as amended), various aspects of the proposed development may have an impact on the environment and are considered to be listed activities. These activities require authorisation from the National Competent Authority (CA), namely the DFFE, prior to the commencement thereof. Specialist studies have been commissioned to verify the sensitivity and assess the impacts of the proposed development, under the Gazetted specialist protocols (GN R 320 and GN R 1150 of 2020).

The scope of this report is the 132kV/400kV On-site MTS and Associated Infrastructure near Dealesville application.

[1] It should be noted that the validity period of the EA issued for the Klipfontein Solar PV Energy Facility in 2016 was extended by the Holder of the EA in April 2021 (14/12/16/3/3/2/722/AM1). The EA issued in 2016 is now valid until 06 June 2026 (i.e., EA lapses on 06 June 2026).

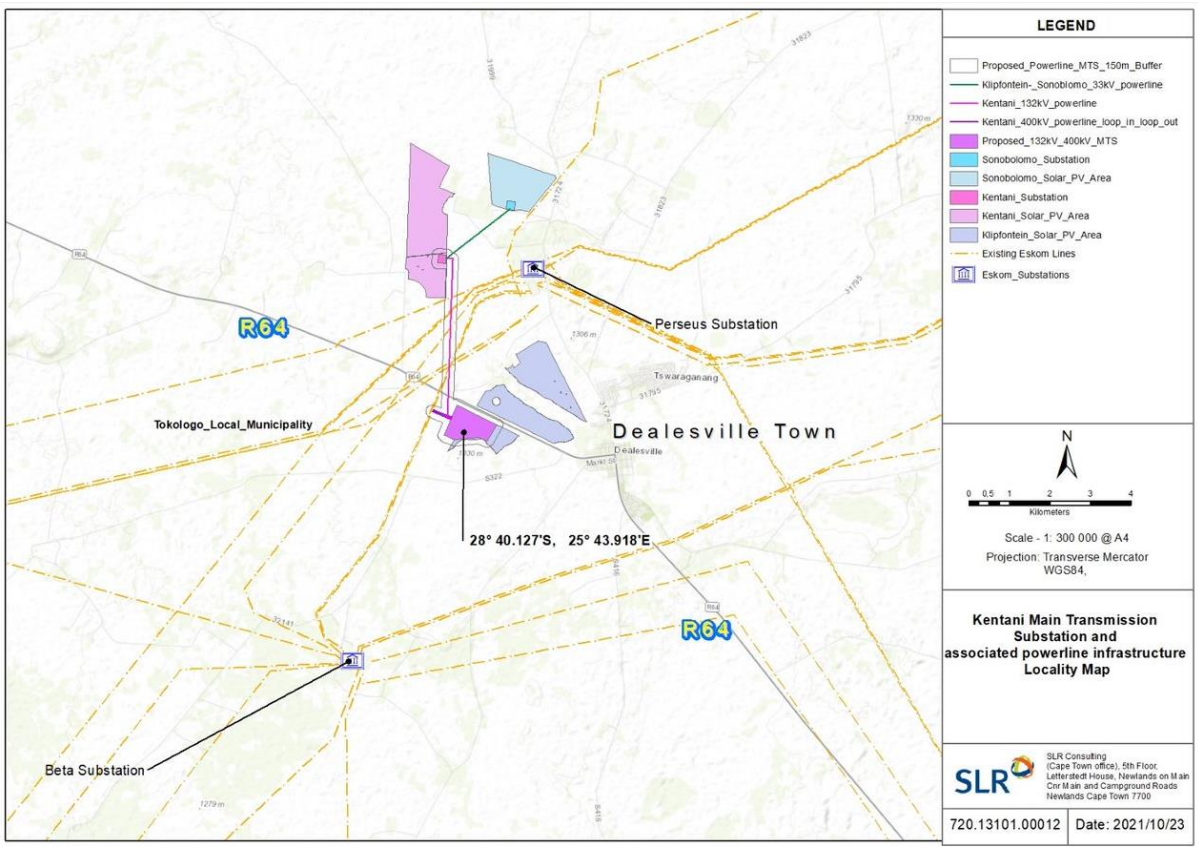

Figure 1:Locality map

2 ASSESSMENT METHODOLOGY

2.1 Specialist Credentials

Appendix 2: E. Butler CV

2.2 Terms of Reference (ToR)

The terms of reference for the appointment have two elements namely

(1) Site Sensitivity Verification Report; and

(2a) Specialist Assessment Report / Compliance Statement (as applicable in terms of GN 320 of 20 March 2020 and GN 1150 of 30 October 2020); **OR**

(2b) Appendix 6 of the EIA Regulations, 2014 (as amended) (should no protocols apply to the discipline).

2.3 Approach

The aim of a Palaeontological Impact Assessment (PIA) is to decrease the effect of the development on potential fossils at the development site.

According to the "SAHRA APM Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports" the purpose of the PIA is: 1) to identify the palaeontological importance of the rock formations in the footprint; 2) to evaluate the palaeontological magnitude of the formations; 3) to clarify the impact on fossil heritage; and 4) to suggest how the developer might protect and lessen possible damage to fossil heritage.
The palaeontological status of each rock section is calculated as well as the possible impact of the development on fossil heritage by a) the palaeontological importance of the rocks, b) the type of development and c) the quantity of bedrock removed.
When the development footprint has a moderate to high palaeontological sensitivity a field-based assessment is necessary. The desktop and the field survey of the exposed rock determine the impact significance of the planned development and recommendations for further studies or mitigation are made. Destructive impacts on palaeontological heritage usually only occur during the construction phase while the excavations will change the current topography and destruct or permanently seal-in fossils at or below the ground surface. Fossil Heritage will then no longer be accessible for scientific research.

Mitigation usually precede construction or may occur during construction when potentially fossiliferous bedrock is exposed. Mitigation comprises the collection and recording of fossils. Preceding excavation of any fossils a permit from SAHRA must be obtained and the material will have to be housed in a permitted institution. When mitigation is applied correctly, a positive impact as possible because our knowledge of local palaeontological heritage may be increased
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/kml's) 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** 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).

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2.4 Assumptions and Limitations

When conducting a Paleontological Impact Assessment (PIA) several factors can affect the accuracy of the assessment. The focal point of geological maps is the geology of the area, and the sheet explanations were not meant to focus on palaeontological heritage. Many inaccessible regions of South Africa have not been reviewed by palaeontologists and data is generally based on aerial photographs. Locality and geological information of museums and universities databases have not been kept up to date or data collected in the past have not always been accurately documented.

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

3 LEGAL REQUIREMENT AND GUIDELINES

National Heritage Resources Act (25 of 1999)

Cultural Heritage in South Africa, includes all heritage resources, 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**".

The identification, evaluation and assessment of any cultural heritage site, artefact or finds in the South African context is required and governed by the following legislation:

- National Environmental Management Act (NEMA) Act 107 of 1998
- National Heritage Resources Act (NHRA) Act 25 of 1999
- Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
- Notice 648 of the Government Gazette 45421- general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified.

The next section in each Act is directly applicable to the identification, assessment, and evaluation of cultural heritage resources.

GNR 982 (Government Gazette 38282, 14 December 2014) promulgated under the National Environmental Management Act (NEMA) Act 107 of 1998

- Basic Assessment Report (BAR) – Regulations 19 and 23
- Environmental Impacts Assessment (EIA) – Regulation 23
- Environmental Scoping Report (ESR) – Regulation 21
- Environmental Management Programme (EMPr) – Regulations 19 and 23

National Heritage Resources Act (NHRA) Act 25 of 1999

- Protection of Heritage Resources – Sections 34 to 36
- Heritage Resources Management – Section 38

MPRDA Regulations of 2014

Environmental reports to be compiled for application of mining right – Regulation 48

- Contents of scoping report – Regulation 49
- Contents of environmental impact assessment report – Regulation 50
- Environmental management programme – Regulation 51
- Environmental management plan – Regulation 52

The NEMA (No 107 of 1998) states that an integrated EMP should (23:2 (b)) "…*identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage*".

In agreement with legislative requirements, EIA rating standards as well as SAHRA policies the following comprehensive and legally compatible PIA report have been compiled.

Palaeontological heritage is exceptional and non-renewable and is protected by the NHRA. Palaeontological resources and 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 Palaeontological Impact assessment forms part of the Heritage Impact Assessment (HIA) and adhere to the conditions of the Act (Please this report in conjunction with Orton, 2021). 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 m^2 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 m^2 in extent.

or any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority

4 PROJECT DESCRIPTION

4.1 Project Location

The proposed project is located approximately 2,5km north-west of the town of Dealesville in the Tokologo Local Municipality, within the Lejweleputswa District Municipality of the Free State Province (as shown in **Error! Reference source not found.**). The proposed project will be located on the following properties / farm portions:

- Remaining Extent of the Farm Klipfontein No. 305 (F00400000000030500000);
- The Farm Leliehoek No. 748 (F00400000000074800000);
- Remainder of the Farm Oxford No. 1030 (F00400000000103000000);
- The Farm Overschot No. 31 (F00400000000003100000)
- Portion 1 of the Farm Walkerville No. 1031 (F00400000000103100001)[2]; and
- Remainder of the Farm Walkerville No. 1031 (F00400000000103100000)[2].

The proposed MTS, BESS and powerlines are located within the within the Kimberly Renewable Energy Development Zone (REDZ)[3] as well as the Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notice No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively.

In addition, the proposed MTS and BESS will be located within the authorised Klipfontein PV facility (14/12/16/3/3/2/722), which is proposed on the Remaining Extent of the Farm Klipfontein No. 305. The eight (8) 132kV powerlines which require re-routing are located within the authorised corridor included as part of the

[2] Property / farm portion traversed by proposed 33kv powerline which will connect to Kentani onsite substation (14/12/16/3/3/2/724). 33kV powerline does however not require authorisation.

3 GN R 786 of 2020: Notice of Identification in Terms of Section 24(5)(a) and (b) ff The National Environmental Management Act, 1998, of the Procedure to be Followed in Applying for Environmental Authorisation for Large Scale Wind and Solar Photovoltaic Energy Development Activities Identified in Terms of Section 24(2)(a) of the National Environmental Management Act, 1998, when occurring in Geographical Areas of Strategic Importance.

authorised solar PV developments. The remaining powerlines [i.e., two (2) 400kV and one (1) 132kV powerlines] being proposed and assessed as part of this BA process (i.e., this application) fall outside of the authorised corridor.

Considering the above, it is important to note that the location of the proposed MTS, BESS as well as the corridor for the eight (8) 132kV powerlines being re-routed have previously been assessed as part of the development footprint for the Kentani Cluster of solar PV developments, each of which received their own EA in 2016[1].

4.2 Project components

The proposed development involves the addition of one (1) MTS, Lithium ion BESS and three (3) powerlines to Mainstream's authorised Kentani Cluster of solar PV developments, as well as the re-routing of eight (8) powerlines within the grid connection corridor authorised as part of the Kentani Cluster and making provision for this routing in the new proposed MTS.

The proposed MTS and associated infrastructure [i.e., eleven (11) powerlines] will service eleven (11) of Mainstream's solar PV projects authorised as part of the Kentani Cluster.

The proposed development requires several key components to facilitate the transmission and distribution of electricity at a large scale. This includes:

- One (1) new 132kV/400kV Main Transmission Substation (MTS);
- One (1) new 132kV overhead powerline;
- Two (2) new 400kV overhead powerlines;
- One (1) new 33kV overhead powerline;
- A road in the servitude under the proposed powerlines; and
- An access road (approx. 4-8m wide) to the R64 provincial route
- Li-Ion Battery Energy Storage System (BESS) up to 4 ha in extent within the assessed site footprint

The proposed MTS will occupy a footprint of approximately 64 hectares (ha) (i.e., 800m x 800m) and the proposed Lithium-Ion Battery Energy Storage System (BESS) with occupy up to 4 ha. The area occupied by the proposed power lines is unknown at this stage. In addition, the proposed MTS will have a capacity of 132/400 kilovolt (kV), while the associated powerlines will have capacities of up to 400kV, 132kV and 33kV respectively. The powerlines and BESS associated with the MTS and which are being proposed as part of this application and BA process are as follows:

1. Two (2) 400kV overhead powerlines (approx. 2km in length) that will connect the proposed MTS to the existing Eskom 400kV powerline, located approx. 1km west of the proposed MTS site, via a Loop-In-Loop Out (LILO) connection;

2. One (1) 132kV powerline (approx. 4.5km in length) that will connect the proposed MTS to the authorised Kentani on-site substation (14/12/16/3/3/2/724), located approx. 4km north-west of the proposed MTS site; and

3. Li-Ion Battery Energy Storage System (BESS) up to 4 ha in extent within the assessed site footprint

Additionally, there is one (1) 33kv powerline (approx. 2km in length) being proposed and will connect the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723), which is located approximately 5km north of the proposed MTS site, to the authorised Kentani on-site substation (14/12/16/3/3/2/724) (approx. 4km north-west of proposed MTS site). This powerline is not subject to the Basic Assessment study as it does trigger the need for an Application for Environmental Authorisation, however, the powerline has been considered by the specialist team.

As mentioned above, the proposed development will also involve the re-routing of eight (8) 132kV powerlines within the grid connection corridor authorised as part of the Kentani Cluster and making provision for this routing in the new proposed MTS. The remaining two (2) 400kV powerlines and one (1) 132kV powerline fall outside of the authorised corridor and will be assessed as part of the BA process for the MTS (i.e., this application).

Powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the proposed 400kV and 132kV powerlines which form part of this BA process (i.e., this application). This is to allow flexibility when routing the powerlines within the authorised corridor (should the EA be granted). No corridor is however being considered for the proposed 33kV powerline.

A road in the servitude under the proposed powerlines as well as an access road (approx. 4-8m wide) to the R64 provincial route will also be required.

Table 1 below represents these various project components and their specifications. The location of these components in relation to the project site is shown on Figure 2.

Table 1:Summary of the key project components

Project Components	Location and size / extent (i.e., Farm Names and Areas)
Location	• Remaining Extent of the Farm Klipfontein No. 305 - F00400000000030500000 • The Farm Leliehoek No. 748 - F00400000000074800000 • Remainder of the Farm Oxford No. 1030 - F00400000000103000000 • Portion 1 of the Farm Walkerville No. 1031 - F004000000001031000012 • Remainder of the Farm Walkerville No. 1031 - F004000000001031000002 • The Farm Overschot No. 31 - F00400000000003100000
Onsite Main Transmission Substation (MTS)	• One (1) new MTS with capacity of 132kV/400kV • Total footprint of up to approx. 64ha (i.e., 800m x 800m) • Will contain transformers for voltage step up from medium voltage (132kV) to high voltage (400kV) • Direct Current (DC) power from the authorised Kentani Cluster of solar PV developments (each of which received their own EA in 2016[1]) will be converted into Alternating Current (AC) power in the inverters and the voltage will be stepped up to high voltage in the inverter transformers • Will be located within authorised Klipfontein PV facility (14/12/16/3/3/2/722), which is proposed on Remaining Extent of the Farm Klipfontein No. 305
Grid Connection (Powerlines)	• Two (2) new 400kV overhead powerlines connecting MTS to existing Eskom 400kV powerline (approx. 1km west of MTS site) via LILO connection; • One (1) new 132kV overhead powerline connecting MTS to authorised Kentani on-site substation (14/12/16/3/3/2/724) (approx. 4km north-west of MTS site); • One (1) new 33kV overhead powerline connecting authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723) (approx. 5km north of MTS site) to authorised Kentani on-site substation (14/12/16/3/3/2/724) (approx. 4km north-west of MTS site) • Length of 400kV powerlines = approx. 2km • Length of 132kV powerline = approx. 4,5-5km • Length of 33kV powerline = approx. 2km • Area occupied by powerlines unknown at this stage • Powerline corridors with widths of 300m (150m on either side of centre line) being proposed and assessed for 400kV and 132kV powerlines to allow flexibility when routing powerlines within authorised corridor (should EA be granted) • No corridor being considered for 33kV powerline • This will allow for flexibility when routing powerline within the authorised corridor • Eight (8) 132kV powerlines within grid connection corridor authorised as part of Kentani Cluster will also be re-routed and provision will be made for this routing in new proposed MTS
Roads	• One (1) new road in servitude under proposed powerlines

	• One (1) new access to the R64 provincial route • Widths of up to approx. 4-8m
BESS	• Li-Ion Battery Energy Storage System up to 4 ha in extent within the assessed site foot print

4.3 Site Layout

The site layout for the proposed project makes provision for one (1) MTS location, (1) BESS location as well as one (1) powerline corridor routing for each of the associated proposed powerlines, as detailed in Table 4-1 above. Due to the comprehensive design process that has been undertaken to inform the site proposed for the MTS as well as the corridors being proposed for the associated powerlines, no site, layout or powerline corridor alternatives will be assessed.

Additionally, the proposed MTS will be located within the authorised Klipfontein PV facility (14/12/16/3/3/2/722), while the eight (8) 132kV powerlines which require re-routing are also located within the authorised corridor included as part of the authorised Kentani Cluster. The remaining two (2) 400kV and one (1) 132kV powerlines being proposed as part of this BA process (i.e., this application) however fall outside of the authorised corridor.

The BESS and powerlines associated with the MTS which are being proposed are as follows:

- Two (2) 400kV overhead powerlines (approx. 2km in length) that will connect the proposed MTS to the existing Eskom 400kV powerline, located approx. 1km west of the proposed MTS site, via a Loop-In-Loop Out (LILO) connection;
- One (1) 132kV powerline (approx. 4.5km in length) that will connect the proposed MTS to the authorised Kentani on-site substation (14/12/16/3/3/2/724), located approx. 4km north-west of the proposed MTS site; and
- Li-Ion Battery Energy Storage System (BESS) up to 4 ha in extent within the assessed site footprint

Additionally, there is one (1) 33kv powerline (approx. 2km in length) being proposed and will connect the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723), which is located approximately 5km north of the proposed MTS site, to the authorised Kentani on-site substation (14/12/16/3/3/2/724) (approx. 4km north-west of proposed MTS site). This powerline is not subject to the Basic Assessment study as it does trigger the need for an Application for Environmental Authorisation, however, the powerline has been considered by the specialist team.

(Figure 2).

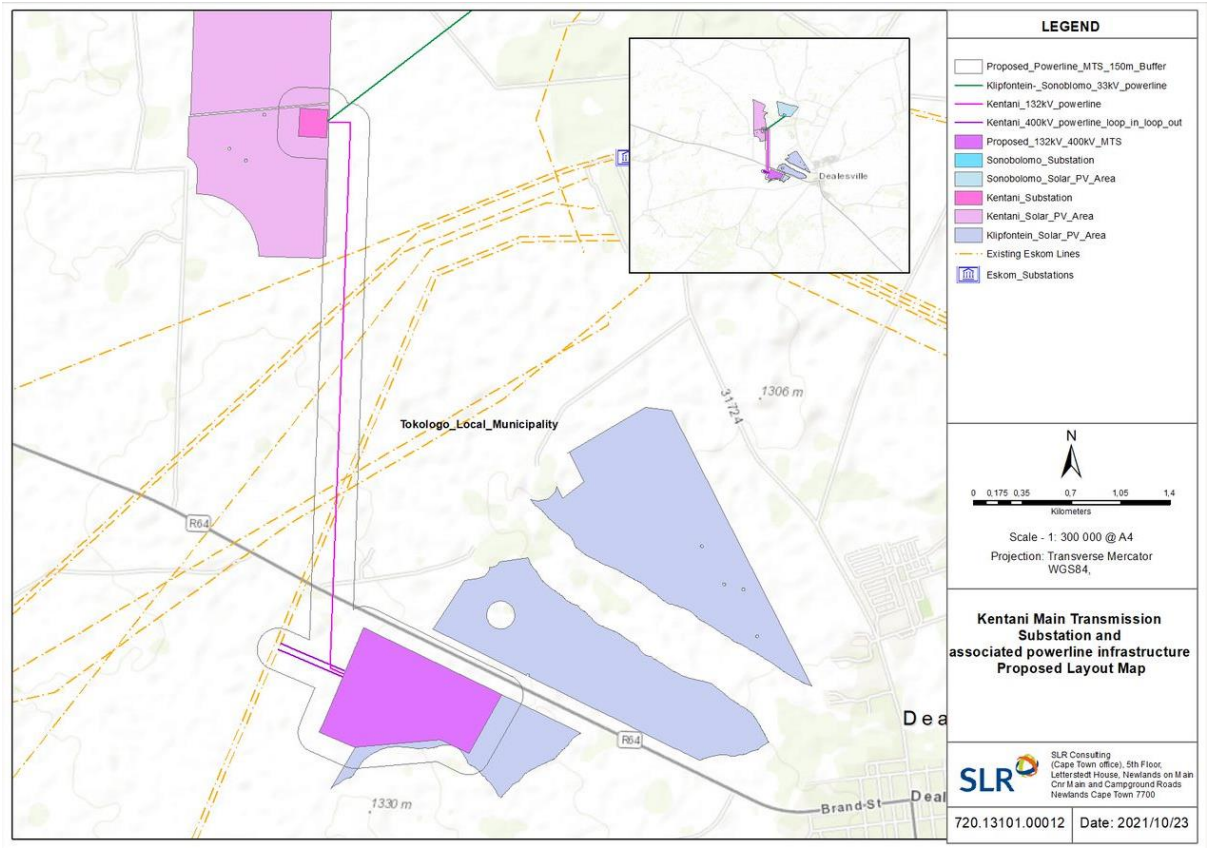

Figure 2: Proposed layout

4.4 Alternatives

As mentioned, a comprehensive design process has been undertaken to inform the site proposed for the MTS as well as the corridors being proposed for the associated powerlines. No site, layout BESS technology alternatives or powerline corridor alternatives are therefore being considered and assessed.

With regards to the BESS, three (3) technology types were however considered for the proposed BESS, namely Lithium Ion (Li-Ion), Vanadium Redox Flow and Zinc-hybrid (Zinc-Bromine - ZNBR) Flow.

The Solid-State Li-ion battery technology was chosen as the preferred technology for the BESS, based on the risk assessment undertaken by Mainstream in the design phase of the project. A concise Risk Assessment of both technologies (Solid State and Flow Batteries) over three (3) battery types (Lithium-Ion, Vanadium Redox Flow and Zinc Hybrid Flow) is included in Appendix 9 of the BAR.

One (1) powerline corridor, with a width of 300m (150m on either side of centre line), for each of the 400kV and 132kV powerlines which form part of this BA process (i.e., this application) are however being proposed and assessed. This is to allow flexibility when routing the powerlines within the authorised corridor. No corridor is being considered for the proposed 33kV powerline.

It is important to note that the proposed MTS will be located within the authorised Klipfontein PV facility (14/12/16/3/3/2/722). In addition, the eight (8) 132kV powerlines which require re-routing are located within the authorised corridor included as part of the authorised Kentani Cluster. The location of the proposed MTS as well as the

corridor for the eight (8) 132kV powerlines being re-routed have therefore previously been assessed as part of the development footprint for the Kentani Cluster of solar PV developments. The two (2) 400kV and one (1) 132kV powerlines being proposed as part of this BA process (i.e., this application) however fall outside of the authorised corridor. The site proposed for the MTS and respective powerline corridors will however be assessed against the '**no-go' alternative**. The 'no-go' alternative is the option of not constructing the project, where the *status quo* of the current activities on the project site would prevail.

5 BASELINE DESCRIPTION OF THE RECEIVING ENVIRONMENT

The proposed Mainstream 132kV/400kV On-site MTS and associated infrastructure near Dealsville in the Free State is depicted on the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria) (Figure 5-1).

The proposed Mainstream 132kV/400kV On-site MTS and associated infrastructure is underlain by Quaternary sediments mantling the Jurassic dolerite, and the Tierberg Formation of the Ecca Group (Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Jurassic dolerite is Zero as it is igneous in origin, that of the Quaternary superficial sediments is low but locally high, while the Tierberg Formation has a High Palaeontological Sensitivity (Almond and Pether, 2009; Almond *et al*., 2013) (Figure 0-2).

As seen on the topographical and Google Earth Images (Figure 1-1 and 1-2) the relief of the proposed project is low. The area is also extensively mantled by superficial alluvium and calcrete soils. Fossils are found in widespread bedding planes in the Tierberg Formation, Ecca Group (Karoo Supergroup) which are not widespread present in the proposed development footprint.

Quaternary superficial deposits are the youngest geological deposits formed during the most recent period of geological time namely the Quaternary (approximately 2.6 million years ago to present). The rocks and sediments can be found at or near the surface of the Earth. Most of the superficial deposits are unconsolidated sediments and consist of calcretes, sand, silt and clay, and they form relatively thin, often discontinuous patches of sediments or larger spreads onshore.

The Quaternary deposits reveal palaeoclimatic changes in the different geological formations (Hunter et al., 2006). The climatic fluctuations in the Cenozoic Era were responsible for the formation of most geomorphologic features in southern Africa (Maud, 2012). Various warming and cooling events occurred in the Cenozoic but climatic changes during the Quaternary, specifically the last 1.8 Ma, were the most drastic climate changes relative to all climate variations in the past Barnosky (2005). Climate in the Quaternary Period were both drier and wetter than the present and resulted in changes in river flow patterns, sedimentation processes and vegetation variation (Tooth et al., 2004).

The fossil assemblages of this Group are generally very low in diversity and occur over a wide range. These fossils represent terrestrial plants and animals with a close resemblance to living forms. Fossil assemblages include bivalves, diatoms, gastropod shells, ostracods and trace fossils. The palaeontology of the Quaternary superficial deposits has

been relatively neglected in the past. Late Cenozoic calcrete may comprise of bones, horn corns as well as mammalian teeth. Tortoise remains have also been uncovered as well as trace fossils which includes termite and insect's burrows and mammalian trackways. Amphibian and crocodile remains have been uncovered where the depositional settings in the past were wetter.

The **Karoo igneous province** (Jd-red, Figure 5-1) is one of the worlds classic continental basalt (CFB) provinces. This province consists of intrusive and extrusive rocks that occur over a large area (Duncan et al, 2006). Generally, the flood basalts do not contribute to prominent volcanic structures, but instead are formed by successive eruptions from a set of fissures that form sub-horizontal lava flows (sills and dykes) varying in thickness. This lava caps the landscape on which they erupted. As the Karoo is an old flood basalt province it is today preserved as erosional fragments of a more extensive lava cap that covered much of southern Africa in the geological past. It is estimated that the Karoo lava outcrop currently covered at least 140 000 km^2 while it was larger in the past [~2 000 000 km^2 (Cox 1970, 1972)]

The Karoo Igneous Province contains a large volume of flood basalts as well as silicic volcanic rocks. These units are comprised of rhyodacite and rhyolitic magma and crops out along the Lebombo monocline. Individual units span up to 60 km and sometimes show massive pyroclastic structures and are thus classified as rheoignimbrites. The basal lavas lie conformable on the Clarens Formation but in specific localities sandstone erosion occurred before the volcanic eruptions took place. Lock *et al* (1974) found evidence in the Eastern Cape that in the early stages of volcanism magma interacted with ground water to produce volcaniclastic deposits as well as phreatic and phreatomagmatic diatremes. Eales *et al* (1984) also found evidence of aqueous environments during early volcanism by the existence of pillow lavas and associated hyaloclastite breccias and thin lenses of fluviatile sandstones interbedded with the lowermost magmas.

The **Tierberg Formation** (Pt, orange, Table 1) consists of a recessive-weathering, thick, mudrock-dominated succession. These rocks comprise mostly of dark, often grey to brown, well-laminated, carbonaceous shales with subordinate thin, fine-grained sandstones (Prinsloo 1989, Le Roux 1993, Viljoen 2005, Johnson et al., 2006). The Early to Middle Permian Tierberg shales were deposited in a series of offshore, quiet water environments below wave base and include basin plain, distal turbidite fan and distal prodelta in ascending order (Viljoen 2005, Almond in Macey et al. 2011). Towards the top of the formation thin coarsening-upwards cycles occur with confined evidence of ripples and common calcareous concretions as well as soft-sediment deformation. Thin volcanic ash layers (water-lain tuffs) are known in these sediments. The Ecca Basin were a restricted, brackish water environment. The Tierberg mudrocks are often baked to a dark grey hornfels with a reddish-brown crust close to the contact with Karoo dolerite intrusions (Prinsloo 1989). The Tierberg formation is known for its rare trace fossils assemblages. Vascular plants (including petrified wood) and palynomorphs of Glossopteris flora have been found while crustaceans, shelly marine invertebrates, insects and fish fossils as well as microfossils have been identified.

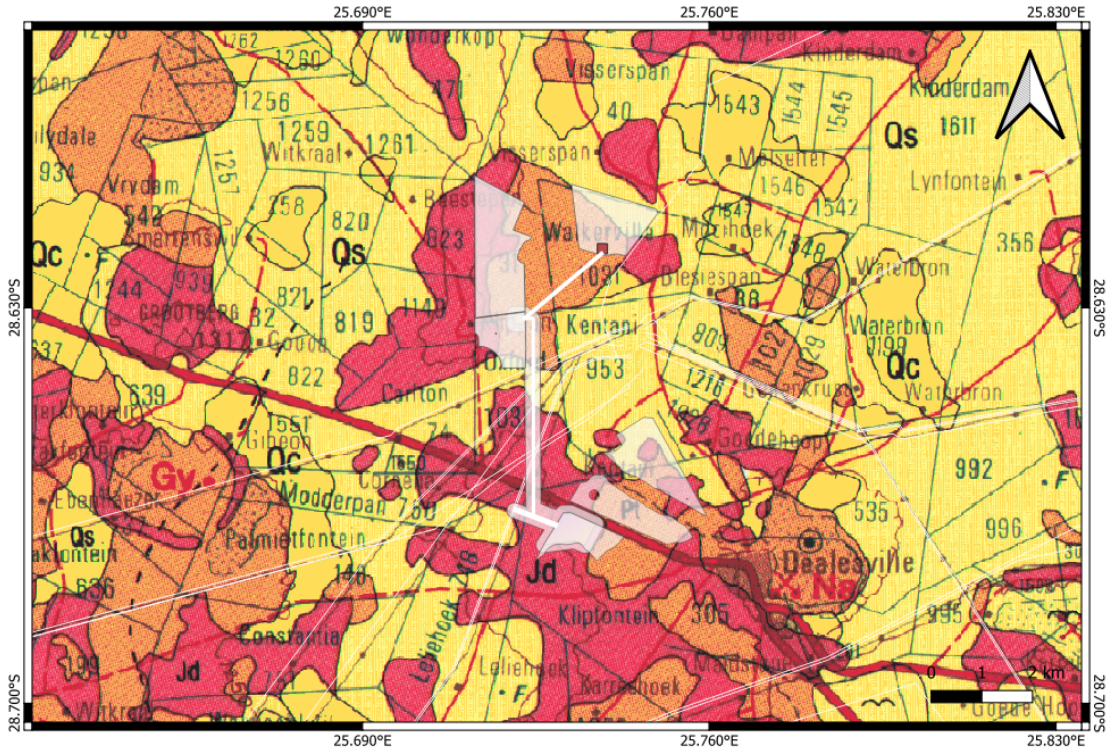

Figure 3: Extract of the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria) indicating (in white) the proposed Mainstream 132kV/400kV On-site MTS and associated infrastructure near Dealsville in the Free State.

Legend of 250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria).

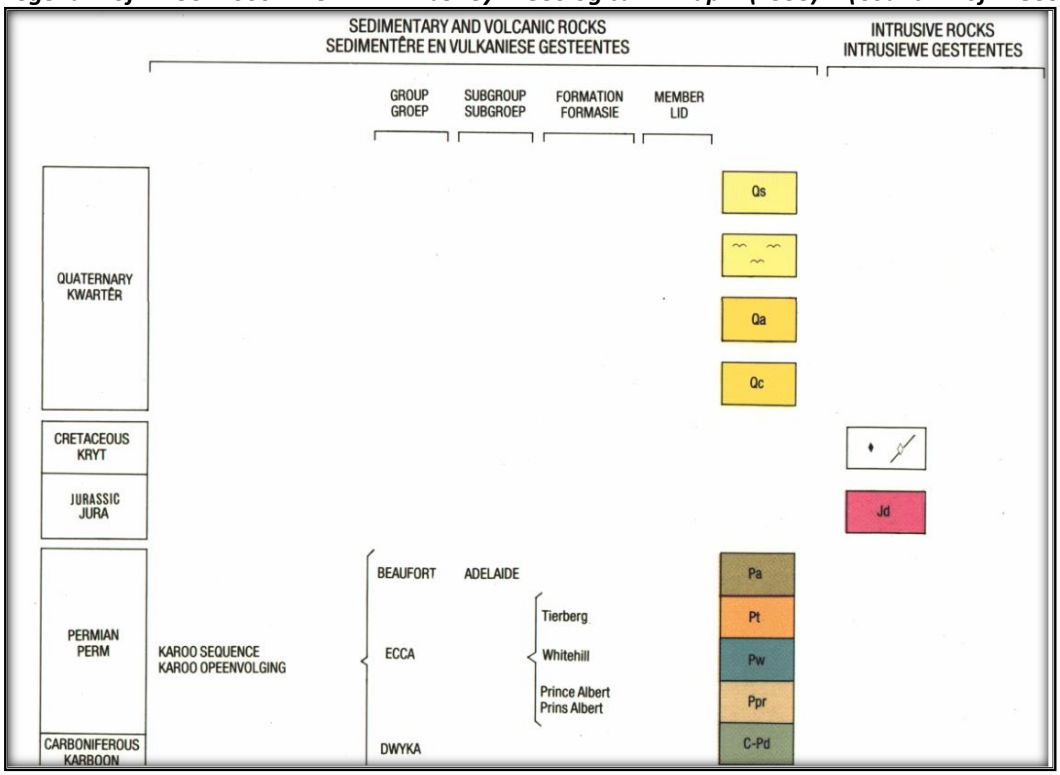

***Table 2**: Legend to Map and short explanation of the development and surrounding sediments (Modified from the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria). Formations present in the development is indicated in bold*

Symbol	Stratigraphy	Lithology
Qs	**Quaternary**	**Sand: Red ab=nd grey Gravel, Diamondiferous in places**
Qa	Quaternary	Alluvial diamondiferous gravel
Qc	Quaternary	Calcrete, calcified pandune and surface limestone.
Qc	Quaternary	Calcrete
Jd	**Jurassic**	**Dolerite**
Pt	**Tierberg Formation, Ecca Group, Karoo Supergroup**	**Sandstone, siltstone, mudstone**
C-Pd	Dwyka Group, Karoo Supergroup	Tillite, sandstone, shale

6 SENSITIVITY MAPPING

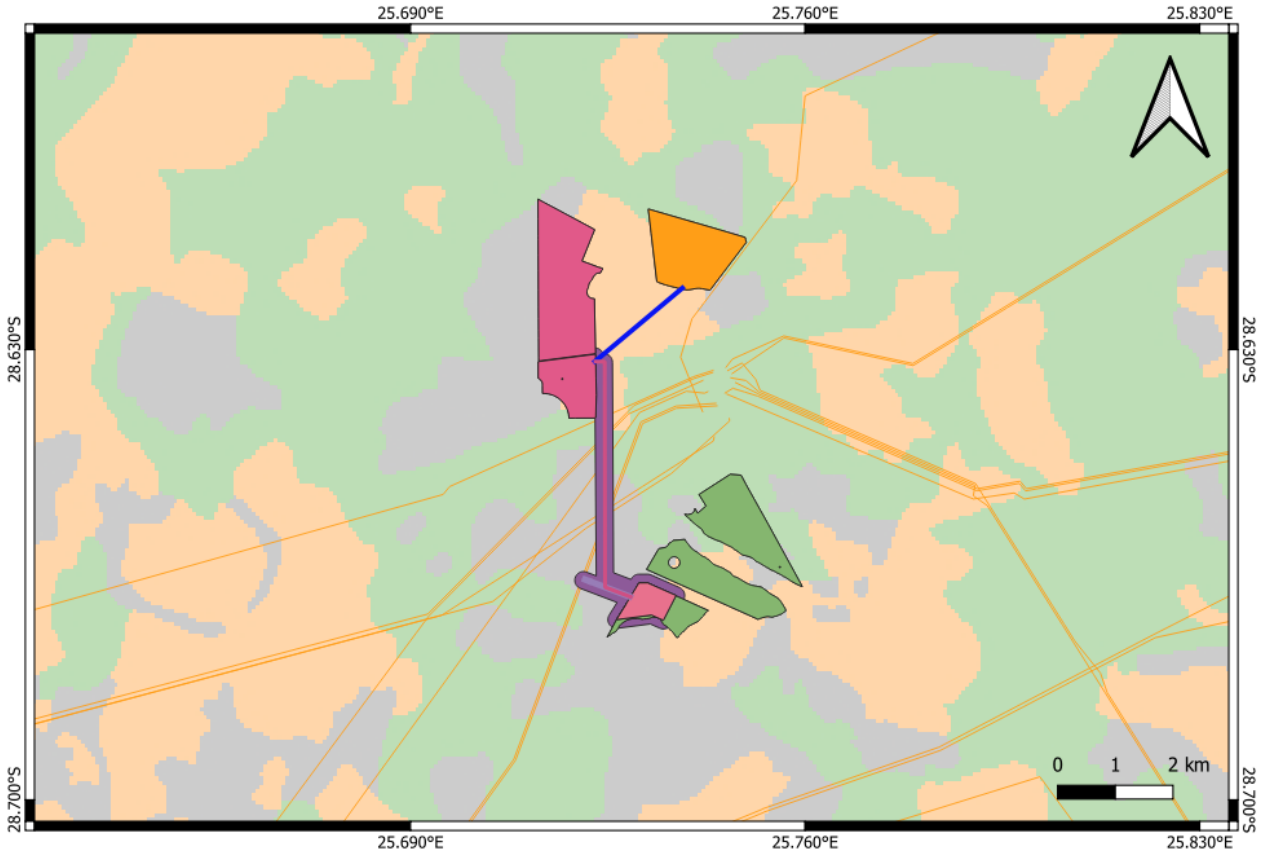

Figure 4: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences). Proposed powerline is indicated in colors. According to the SAHRIS Palaeosensitivity map the proposed development is underlain by sediments with a High (orange,) Medium (green) and areas of Zero (grey) Palaeontological Significance.

Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	**HIGH**	**desktop study is required and based on the outcome of the desktop study; a field assessment is likely**
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

The colors on the PalaeoMap indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero

7 SPECIALIST FINDINGS ASSESSMENT OF IMPACTS

It is important to note that destructive impacts on palaeontological heritage usually only occur during the construction phase. Excavations will change the current topography and destruct or permanently seal-in fossils at or below the ground surface. Fossil Heritage will then no longer be accessible for scientific research.

Impacts on the following phases of the development will thus be zero

- Design / Pre-Construction;
- Operation; and
- Decommissioning.

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 11 September and 27 October 2021. Although isolated outcrops of the Tierberg Formation (Ecca Group, Karoo Supergroup is present no visible evidence of fossils was identified.

Figure 5: Northern Margin of the proposed development

Figure 6: Flat topography and grassy vegetation of the proposed site with no fossiliferous outcrops

GPS coordinates S-28,629167 and E25,736944

Figure 7:Flat topography, very short grass with a few trees. No fossiliferous outcrops.

GPS coordinates S-28,668333 and E25,757778

Figure 8:Existing powerlines in grass veld. No fossiliferous outcrops

GPS coordinates S-28,662222 and E25,736944

Figure 9:View over development towards the north. Note the flat topography and grassy vegetation .No fossiliferous outcrops

GPS coordinates S-28,664167 and E25,728889

Figure 10:Flat topography and grassy vegetation of the proposed site with no fossiliferous outcrops

GPS coordinates S-28,682500 and E25,720000

Figure 11:Flat topography and high grassy vegetation with isolated trees in the proposed footprint. No fossiliferous outcrops.

GPS coordinates S-28,696389 and E25,715000

Figure 12:View towards the south with electricity infrastructure in the background. No fossiliferous outcrops

GPS coordinates S-28,716111 and E25,700833

Figure 13: East of the R64 an unfossiliferous outcrop of the Tierberg Formation (Ecca Group, Karoo Supergroup) is present. No fossils were discovered .

GPS coordinates S-28,620000 and E25,749722

7.1 Impact assessment

It is important to note that destructive impacts on palaeontological heritage usually only occur during the construction and decommission phases while the excavations will change the current topography and destruct or permanently seal-in fossils at or below the ground surface. Fossil Heritage will then no longer be accessible for scientific research.

Impacts on the following phases of the development will thus be zero

- Design / Pre-Construction;
- Operation; and
- Decommissioning.

Issue	Destruction of fossil heritage	
Description of Impact		
The excavations and site clearance of the powerline will involve extensive excavations into the superficial sediment cover as well as into the underlying bedrock. These excavations will change the existing topography and may destroy and seal-in fossils at or below the ground surface. These fossils will then no longer be available for research. According to the Geology of the project site there is a Very High possibility of finding fossils during construction.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	High	Low
Duration	Permanent	Permanent
Extent	Site	Site
Consequence	High	Very Low
Probability	Probable	Unlikely / improbable
Significance	High -	Low -
Degree to which impact can be reversed	Irreversible	
Degree to which impact may cause irreplaceable loss of resources	Irreplicable loss of fossil heritage	
Degree to which impact can be mitigated	Mitigation of the damage and destruction of fossil heritage within the planned footprint would entail the collection and describing of fossils. See Chance find Protocol	
Mitigation actions		
The following measures are recommended:	Chance Find Procedure	
Monitoring		
The following monitoring is recommended:	N/A	

The expected duration of the impact is assessed as potentially permanent to long term. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be **permanent**. Impacts on palaeontological heritage during the construction phase could potentially occur but are regarded as having a high possibility. The significance of the impact occurring will be low as no fossiliferous outcrops have been identified during the field visit

7.2 Alternatives

As mentioned, a comprehensive design process has been undertaken to inform the site proposed for the MTS as well as the corridors being proposed for the associated powerlines. No site, layout BESS technology alternatives or powerline corridor alternatives are therefore being considered and assessed.

With regards to the BESS, three (3) technology types were however considered for the proposed BESS, namely Lithium Ion (Li-Ion), Vanadium Redox Flow and Zinc-hybrid (Zinc-Bromine - ZNBR) Flow.

The Solid-State Li-ion battery technology was chosen as the preferred technology for the BESS, based on the risk assessment undertaken by Mainstream in the design phase of the project. A concise Risk Assessment of both technologies (Solid State and Flow Batteries) over three (3) battery types (Lithium-Ion, Vanadium Redox Flow and Zinc Hybrid Flow) is included in Appendix 9 of the BAR.

One (1) powerline corridor, with a width of 300m (150m on either side of centre line), for each of the 400kV and 132kV powerlines which form part of this BA process (i.e., this application) are however being proposed and assessed. This is to allow flexibility when routing the powerlines within the authorised corridor. No corridor is being considered for the proposed 33kV powerline.

It is important to note that the proposed MTS will be located within the authorised Klipfontein PV facility (14/12/16/3/3/2/722). In addition, the eight (8) 132kV powerlines which require re-routing are located within the authorised corridor included as part of the authorised Kentani Cluster. The location of the proposed MTS as well as the corridor for the eight (8) 132kV powerlines being re-routed have therefore previously been assessed as part of the development footprint for the Kentani Cluster of solar PV developments. The two (2) 400kV and one (1) 132kV powerlines being proposed as part of this BA process (i.e., this application) however fall outside of the authorised corridor. The site proposed for the MTS and respective powerline corridors will however be assessed against the 'no-go' alternative. The 'no-go' alternative is the option of not constructing the project, where the status quo of the current activities on the project site would prevail

As the geology of the proposed development and all alternatives is the same, the Significance of the alternatives will be the same as that of the project namely high without mitigation and low after mitigation.

7.3 Cumulative Impacts

In relation to an activity, cumulative impact means "*the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may be significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities*" (NEMA EIA Reg GN R982 of 2014).

The South African Renewable Energy EIA Application Database (REEA) (namely "REEA_OR_2021_Q2") and other information available at the time[4] shows that there are no operational renewable energy developments situated within a 30km radius of the proposed project site. There are however several renewable energy projects (solar) authorised or being proposed within close proximity to the town of Dealesville, including the Kentani Cluster which consists of eleven (11) authorised solar PV projects and associated electrical infrastructure. According to the information available at the time[4], the following renewable energy applications for EA are either approved (i.e., EA issued) or being proposed within a 30km radius of the proposed project site:

- 100 MW Kentani PV - 14/12/16/3/3/2/724
- 100 MW Klipfontein PV - 14/12/16/3/3/2/722
- 100 MW Braklaagte PV - 14/12/16/3/3/2/727
- 100 MW Meeding PV - 14/12/16/3/3/2/719
- 100 MW Irene PV - 14/12/16/3/3/2/718
- 100 MW Leliehoek PV - 14/12/16/3/3/2/728
- 75 MW Sonoblomo PV - 14/12/16/3/3/2/723
- 75 MW Klipfontein PV 2 - 14/12/16/3/3/2/726
- 75 MW Braambosch PV - 14/12/16/3/3/2/725
- 75 MW Boschrand PV 2 - 14/12/16/3/3/2/720
- 75 MW Eksteen PV - 14/12/16/3/3/2/717
- 75 MW solar PV facility which forms part of Kentani Photovoltaic solar Energy Facilities and Supporting Electrical Infrastructure - 14/12/16/3/3/2/721
- Klipbult solar plant - 14/12/16/3/3/2/432
- 75 MW Sebina Letsatsi Solar PV Facility - 14/12/16/3/3/2/755
- 100 MW Edison PV Solar Facility and shared electricity Infrastructure - 14/12/16/3/3/2/851
- 100 MW Maxwell PV Solar Facility and shared electricity Infrastructure - 14/12/16/3/3/2/852
- 100 MW Marconi PV solar projects and associated infrastructure - 14/12/16/3/3/2/853
- 100 MW Watt PV solar projects and associated infrastructure - 14/12/16/3/3/2/854
- 100 MW Farday PV solar projects and associated infrastructure - 14/12/16/3/3/2/855

[4] Information has been based on the latest available version of the South African Renewable Energy EIA Application Database (REEA) ("REEA_OR_2021_Q2"), the results of the respective online screening tool reports (https://screening.environment.gov.za/screeningtool/#/pages/welcome) and information available on the public domain at the time.

- 100 MW Visserpan solar photovoltaic facility project 2 - 14/12/16/3/3/1/2154
- 100 MW Visserpan solar photovoltaic facility project 3 - 14/12/16/3/3/1/2155
- 100 MW Visserpan solar photovoltaic facility project 4 - 14/12/16/3/3/1/2156

In addition, the Jedwater Solar Power Facility (12/12/20/1972/2) and Letsatsi solar power farm (12/12/20/1972/1) are situated just outside of the project site's 30km radius, to the south-east of the project site.

The cumulative impact assessed will therefore be the collective impact of the proposed MTS, BESS and powerline application, along with the above-mentioned renewable energy applications for EA which are either approved or being proposed within a 30km radius of the proposed project site.

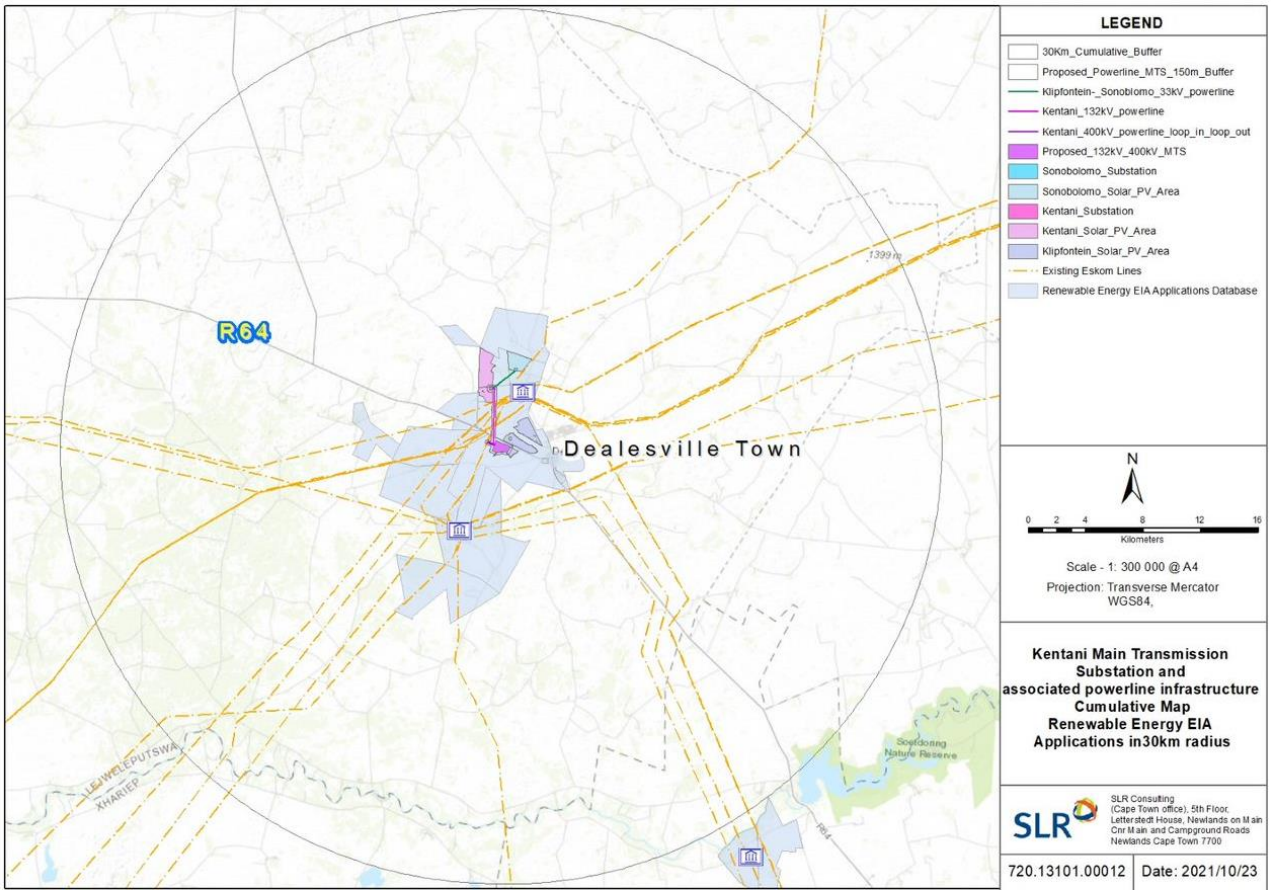

Figure 714: Cumulative Map indicating REFs within the 30km buffer of the proposed MTS and Powerlines (including Powerline Corridors)

The cumulative Impacts of the area will include approved electrical facilities within a 30 km radius of the project site. As the mentioned MTS and Powerlines and corridors are all underlain by similar geology the Impact on these developments will be similar. The Palaeontological Significance of this current powerline construction is rated as **Low** and the cumulative Impacts will thus also be Very **Low Negative**.

Issue	Destruction of fossil heritage	
Description of Impact		
The excavations and site clearance of the powerline will involve extensive excavations into the superficial sediment cover as well as into the underlying bedrock. These excavations will change the existing topography and may destroy and seal-in fossils at or below the ground surface. These fossils will then no longer be available for research. According to the Geology of the project site there is a Very High possibility of finding fossils during construction.		
Cumulative impacts		
Nature of cumulative impacts	Loss of Fossil Heritage	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	Very Low -

8 MITIGATION AND EMPR REQUIREMENTS

8.2. CHANCE FIND PROTOCOL

The following procedure will only be followed if fossils are uncovered during excavation.

8.3. LEGISLATION

Cultural Heritage in South Africa (includes all heritage resources) is protected by the **National Heritage Resources Act (Act No 25 of 1999) (NHRA).** According to Section 3 of the Act, all Heritage resources 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 and are the property of the State. It is thus the responsibility of the State to manage and conserve fossils on behalf of the citizens of South Africa. Palaeontological resources may not be excavated, 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.

8.4. BACKGROUND

A fossil is the naturally preserved remains (or traces thereof) of plants or animals embedded in rock. These organisms lived millions of years ago. Fossils are extremely rare and irreplaceable. By studying fossils, it is possible to determine environmental conditions that existed in a specific geographical area, millions of years ago.

8.5. INTRODUCTION

This informational document is intended for workmen and foremen on construction sites. It describes the actions to be taken when construction activities accidentally uncovers fossil material.

It is the responsibility of the Environmental Site Officer (ESO) or site manager of the project to train the workmen and foremen in the procedure to follow when a fossil is accidentally uncovered. In the absence of the ESO, a member of

the staff must be appointed to be responsible for the proper implementation of the chance find protocol as not to compromise the conservation of fossil material.

8.6. CHANCE FIND PROCEDURE

- If a chance find is made the person responsible for the find must immediately **stop working** and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately **report** the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within **24 hours** of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- The site must be secured to protect it from any further damage. **No attempt** should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- If the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO. Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once the Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

8 CONCLUSION AND SUMMARY

8.3 Summary of Findings

The proposed Mainstream 132kV/400kV On-site MTS, BESS and associated infrastructure is underlain by Quaternary sediments mantling the Jurassic dolerite, and the Tierberg Formation of the Ecca Group (Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Quaternary superficial sediments is low but locally high, that of the Jurassic dolerite is Zero as it is igneous in origin, while the Tierberg Formation has a High Palaeontological Sensitivity (Almond and Pether, 2009; Almond *et al*., 2013).

Large areas of the proposed Mainstream 132kV/400kV On-site MTS, BESS and associated infrastructure are underlain by Jurassic dolerite while a small portion of the development is underlain by the Tierberg Formation (Ecca Group, Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of Jurassic dolerite is Zero as it is igneous in origin while that of the Tierberg Formation is High (Almond and Pether, 2009; Almond *et al*., 2013).

A site-specific field survey of the proposed Mainstream electrical development was conducted on foot and by motor vehicle on 11 September and 27 October 2021. No visible evidence of fossiliferous outcrops was found. For this reason, an overall low palaeontological sensitivity is allocated to the development footprint. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the proposed electrical infrastructure will be of a low significance in palaeontological terms. It is therefore considered that the proposed development is feasible and will not lead to detrimental impacts on the palaeontological reserves of the area. The construction of the development may thus be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the ECO or site manager in charge of these developments. Fossil discoveries ought to be protected and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that suitable mitigation (recording and collection) can be carried out.

8.4 Conclusion and Impact Statement

The significance of the impact occurring will be High before mitigation and Low after mitigation.

The overall impact of the proposed Mainstream 132kV/400kV On-site MTS, BESS and associated infrastructure, on the paleontological resources, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.

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Appendix 1: Impact Assessment Methodology

PART A: DEFINITIONS AND CRITERIA		
Determination of CONSEQUENCE	**Consequence is a function of intensity, spatial extent and duration**	
Determination of SIGNIFICANCE	**Significance is a function of consequence and probability**	
Criteria for ranking of the INTENSITY of environmental impacts	**Very High**	Severe change, disturbance or degradation caused to receptors. Associated with severe consequences. May result in severe illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Substantial intervention will be required.
	High	Prominent change, or large degree of modification, disturbance or degradation caused to receptors or which may affect a large proportion of receptors, possibly entire species or community.
	Medium	Moderate change, disturbance or discomfort caused to receptors and/or which may affect a moderate proportion of receptors.
	Low	Minor (slight) change, disturbance or nuisance caused to receptors which is easily tolerated without intervention, or which may affect a small proportion of receptors.
	Very Low	Negligible change, disturbance or nuisance caused to receptors which is barely noticeable or may have minimal effect on receptors or affect a limited proportion of the receptors.
Criteria for ranking the DURATION of impacts	**Very Short-term**	The duration of the impact will be < 1 year or may be intermittent.
	Short-term	The duration of the impact will be between 1 - 5 years.
	Medium-term	The duration of the impact will be Medium-term between, 5 to 10 years.
	Long-term	The duration of the impact will be Long-term, between 10 and 20 years. (Likely to cease at the end of the operational life of the activity).
	Permanent	The duration of the impact will be permanent
Criteria for ranking the EXTENT of impacts	**Site**	Impact is limited to the immediate footprint of the activity and immediate surrounds within a confined area.
	Local	Impact is confined to within the project site / area and its nearby surroundings.
	Regional	Impact is confined to the region, e.g., coast, basin, catchment, municipal region, district, etc.
	National	Impact may extend beyond district or regional boundaries with national implications.
	International	Impact extends beyond the national scale or may be transboundary.

PART B: DETERMINING CONSEQUENCE						
		EXTENT				
		Site	Local	Regional	National	International
Intensity- Very Low						
DURATION	Permanent	**Low**	**Low**	**Medium**	**Medium**	**High**
	Long-term	**Low**	**Low**	**Low**	**Medium**	**Medium**
	Medium-term	**Very Low**	**Low**	**Low**	**Low**	**Medium**
	Short-term	**Very low**	**Very Low**	**Low**	**Low**	**Low**
	Very Short-term	**Very low**	**Very Low**	**Very Low**	**Low**	**Low**
Intensity -Low						
DURATION	Permanent	**Medium**	**Medium**	**Medium**	**High**	**High**
	Long-term	**Low**	**Medium**	**Medium**	**Medium**	**High**
	Medium-term	**Low**	**Low**	**Medium**	**Medium**	**Medium**
	Short-term	**Low**	**Low**	**Low**	**Medium**	**Medium**
	Very Short-term	**Very low**	**Low**	**Low**	**Low**	**Medium**
Intensity- Medium						
DURATION	Permanent	**Medium**	**High**	**High**	**High**	**Very High**
	Long-term	**Medium**	**Medium**	**Medium**	**High**	**High**
	Medium-term	**Medium**	**Medium**	**Medium**	**High**	**High**
	Short-term	**Low**	**Medium**	**Medium**	**Medium**	**High**
	Very Short-term	**Low**	**Low**	**Low**	**Medium**	**Medium**
Intensity -High						
DURATION	Permanent	**High**	**High**	**High**	**Very High**	**Very High**
	Long-term	**Medium**	**High**	**High**	**High**	**Very High**
	Medium-term	**Medium**	**Medium**	**High**	**High**	**High**
	Short-term	**Medium**	**Medium**	**Medium**	**High**	**High**
	Very Short-term	**Low**	**Medium**	**Medium**	**Medium**	**High**
Intensity - Very High						
DURATION	Permanent	**High**	**High**	**Very High**	**Very High**	**Very High**

	Long-term	**High**	**High**	**High**	**Very High**	**Very High**
	Medium-term	**Medium**	**High**	**High**	**High**	**Very High**
	Short-term	**Medium**	**Medium**	**High**	**High**	**High**
	Very Short-term	**Low**	**Medium**	**Medium**	**High**	**High**
		Site	Local	Regional	National	International
		EXTENT				

PART C: DETERMINING SIGNIFICANCE						
PROBABILITY **(of exposure to impacts)**	Definite/ Continuous	**Very Low**	**Low**	**Medium**	**High**	**Very High**
	Probable	**Very Low**	**Low**	**Medium**	**High**	**Very High**
	Possible/ frequent	**Very Low**	**Very Low**	**Low**	**Medium**	**High**
	Conceivable	**Insignificant**	**Very Low**	**Low**	**Medium**	**High**
	Unlikely/ improbable	**Insignificant**	**Insignificant**	**Very Low**	**Low**	**Medium**
		Very Low	Low	Medium	High	Very High
		CONSEQUENCE				

PART D: INTERPRETATION OF SIGNIFICANCE		
Very High -	Very High +	Represents a key factor in decision-making. In the case of adverse effects, the impact would be considered a fatal flaw unless mitigated to lower significance.
High -	High +	These beneficial or adverse effects are considered to be very important considerations and are likely to be material for the decision-making process. In the case of negative impacts, substantial mitigation will be required.
Medium -	Medium +	These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such issues may become a decision-making issue if leading to an increase in the overall adverse effect on a particular resource or receptor. In the case of negative impacts, mitigation will be required.
Low -	Low +	These beneficial or adverse effects may be raised as localised issues. They are unlikely to be critical in the decision-making process but could be important in the subsequent design of the project. In the case of negative impacts, some mitigation is likely to be required.

Very Low -	Very Low +	These beneficial or adverse effects will not have an influence on the decision, neither will they need to be taken into account in the design of the project. In the case of negative impacts, mitigation is not necessarily required.
Insignificant		Any effects are beneath the levels of perception and inconsequential, therefore not requiring any consideration.

Appendix 2

CURRICULUM VITAE

ELIZE BUTLER

PROFESSION:	Palaeontologist
YEARS' EXPERIENCE:	28 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

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

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