

Agriculture

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**SITE SENSITIVITY VERIFICATION
AND
AGRICULTURAL COMPLIANCE STATEMENT
FOR
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**

**Report by
Johann Lanz**

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EXECUTIVE SUMMARY

The key findings of this study are:

- The site has low agricultural potential because of soil and climate constraints and is therefore unsuitable for cultivated crop production. Agricultural land use is limited to grazing.
- The site has been assessed as being of medium agricultural sensitivity.
- Only one negative agricultural impact was identified, namely loss of agricultural potential by occupation of 64 hectares of land.
- The conclusion of this assessment is that the proposed development will have very low agricultural impact and will be acceptable in terms of its impact on the agricultural production capability of the site. This is substantiated by the fact that the loss is of agricultural land of low potential that is only suitable as grazing land.
- From an agricultural impact point of view, it is recommended that the development be approved.

1 INTRODUCTION

Environmental authorisation is being sought for the 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 (see location in Figure 1). In terms of the National Environmental Management Act (Act No 107 of 1998) (NEMA), an application for environmental authorisation requires an agricultural assessment, in this case an Agricultural Compliance Statement (see terms of reference, below).

Johann Lanz was appointed as an independent agricultural specialist to provide the Agricultural Compliance Statement. The objective and focus of an Agricultural Compliance Statement is to assess whether or not the proposed development will have an unacceptable agricultural impact or not, and based on this, to make a recommendation on whether it should be approved or not.

The aim of the protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources is to preserve valuable agricultural land for agricultural production.

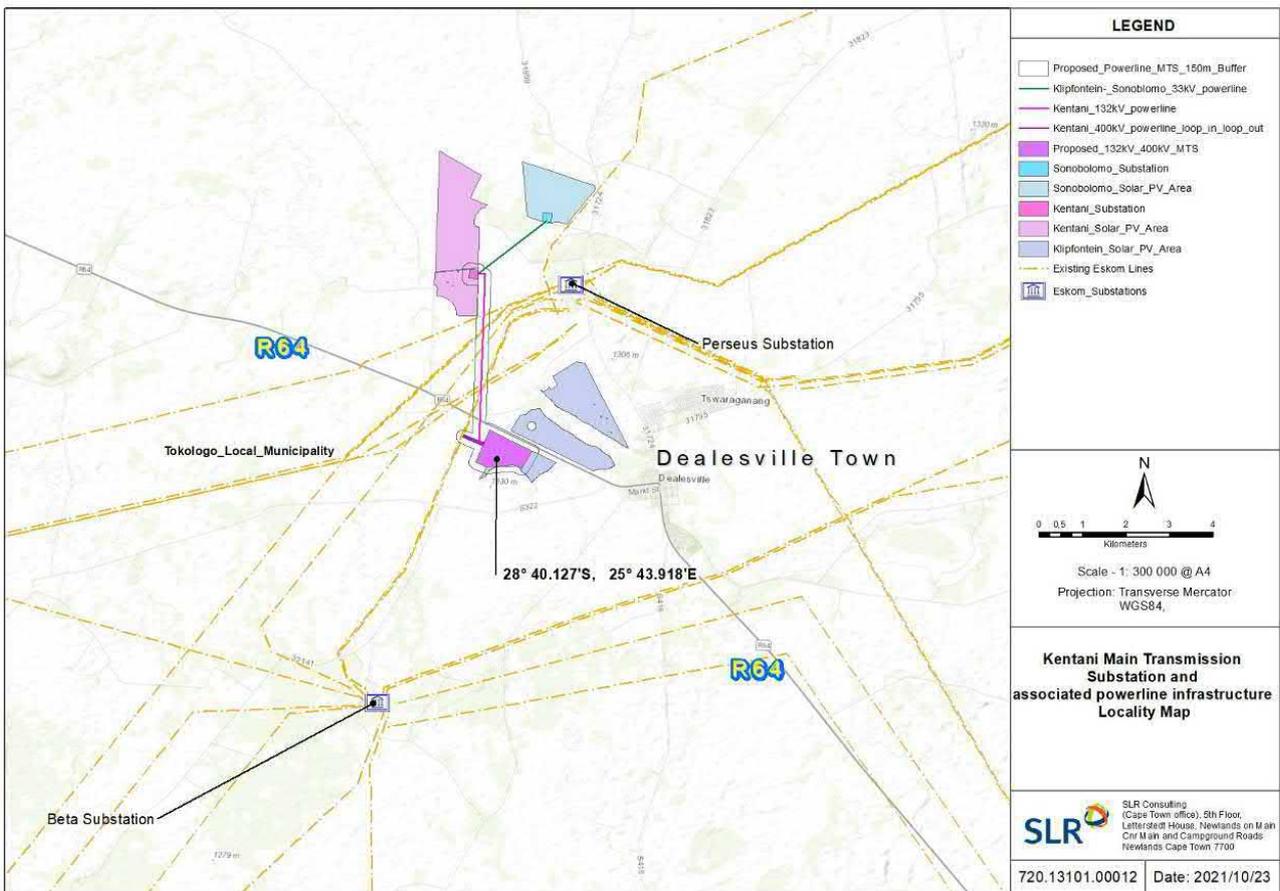


Figure 1: Locality map of the development, west of the town of Dealesville.

2 PROJECT DESCRIPTION

2.1 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 Figure 1). 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 Overshot No. 31 (F00400000000003100000);
- Portion 1 of the Farm Walkerville No. 1031 (F00400000000103100001)¹; and
- Remainder of the Farm Walkerville No. 1031 (F00400000000103100000).

The proposed MTS and powerlines are located within the within the Kimberly Renewable Energy Development Zone (REDZ)² 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 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 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.

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

¹ 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.

² GN R 786 of 2020: Notice of Identification in Terms of Section 24(5)(a) and (b) of 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.

- 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

Considering the above, it is important to note that the location of the proposed MTS 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.

2.2 Project components

The proposed development involves the addition of one (1) MTS 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.
- An Li-Ion Battery Energy Storage System (BESS) up to 4 ha in extent within the

assessed site footprint

The proposed MTS will have a capacity of 132kV/400kV and will occupy a footprint of approximately 64 hectares (ha) (i.e., 800m x 800m)).

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) will 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 not 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).

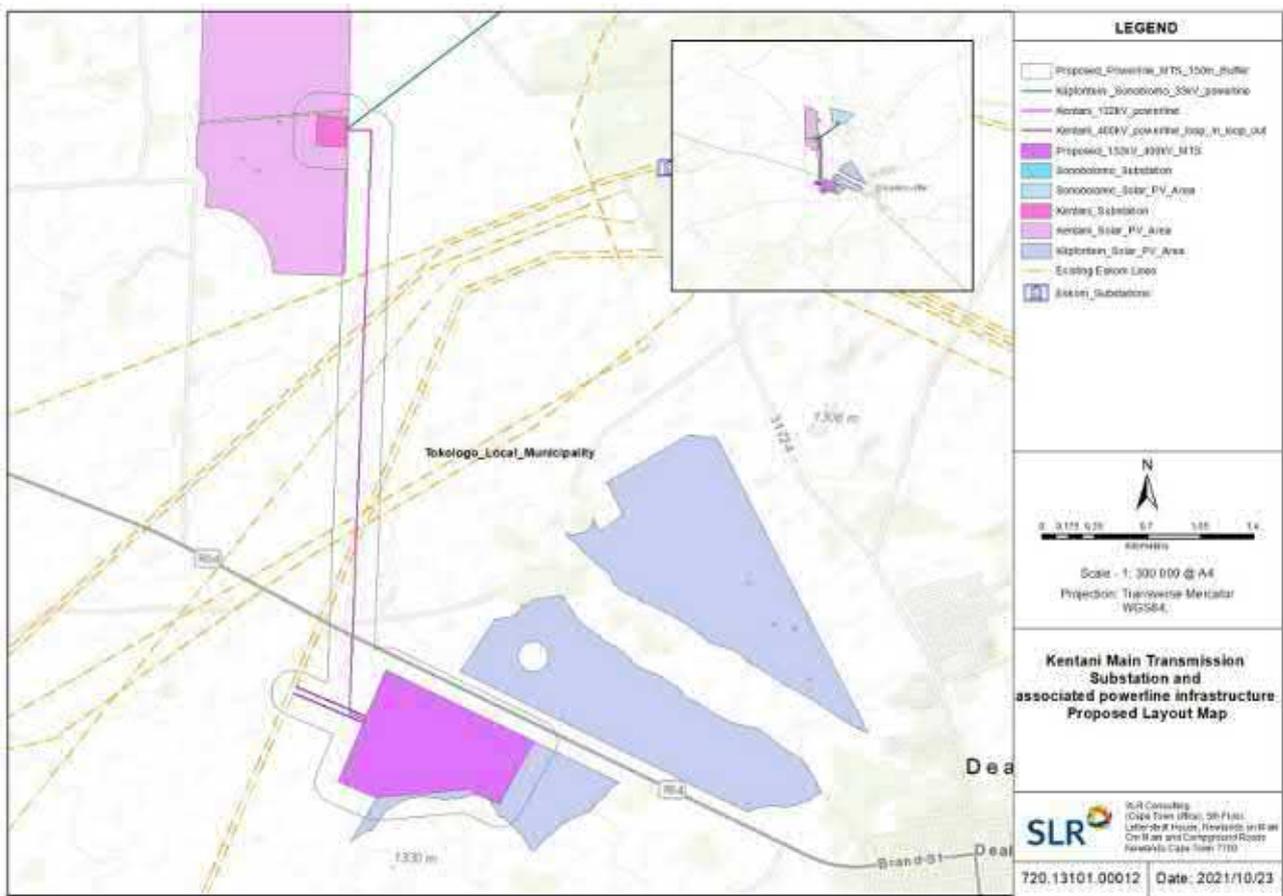
Powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the proposed 400kV and 132kV powerlines which form part of this BA process (i.e., this application). This is to allow flexibility when routing the powerlines within the authorised corridor (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.

2.3 Site Layout

The site layout for the proposed project makes provision for one (1) MTS location as well as one (1) powerline corridor routing for each of the associated proposed powerlines.. 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 site layout being proposed is shown in Figure 2 below.

Figure 2. Layout map of the proposed development.

2.4 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.

3 LEGAL REQUIREMENT AND GUIDELINES

The Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA) requires that any long term lease associated with the renewable energy facility be approved by the National Department of Agriculture, Land Reform and Rural Development (DALRRD). The SALA consent is separate from the application for Environmental Authorisation, and needs to be

applied for and obtained separately.

Power lines require the registration of a servitude for each farm portion crossed. In terms of the Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA), the registration of a power line servitude requires written consent of the Minister if the following two conditions apply:

- if the servitude width exceeds 15 metres; and
- if Eskom is not the applicant for the servitude.

If one or both of these conditions do not apply, then no agricultural consent is required. Eskom is currently exempt from agricultural consent for power line servitudes.

4 TERMS OF REFERENCE

The terms of reference for this study is to fulfill the requirements of the *Protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources* gazetted on 20 March 2020 in GN 320 (in terms of Sections 24(5)(A) and (H) and 44 of NEMA, 1998).

The verified agricultural site sensitivity of the MTS is less than high. The level of agricultural assessment required in terms of the protocol for sites of less than high sensitivity is an Agricultural Compliance Statement. The power lines are linear activities and therefore also require only an Agricultural Compliance Statement.

The terms of reference for an Agricultural Compliance Statement, as stipulated in the protocol, are listed below, and the section number of this report which fulfils each stipulation is given after it in brackets.

1. The Agricultural Compliance Statement must be prepared by a soil scientist or agricultural specialist registered with the South African Council for Natural Scientific Professions (SACNASP).
2. The compliance statement must:
 1. be applicable to the preferred site and proposed development footprint;
 2. confirm that the site is of “low” or “medium” sensitivity for agriculture (Section 6); and
 3. indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site (Section 8.7).
3. The Agricultural Compliance Statement must contain, as a minimum, the following information:
 1. details and relevant experience as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the statement including a

- curriculum vitae (Appendix 1);
2. a signed statement of independence by the specialist (Appendix 2);
3. a map showing the proposed development footprint (including supporting infrastructure) with a 50 m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool (Figure 3);
4. confirmation from the specialist that all reasonable measures have been taken through micro-siting to avoid or minimize fragmentation and disturbance of agricultural activities (Section 8.5);
5. a substantiated statement from the soil scientist or agricultural specialist on the acceptability, or not, of the proposed development and a recommendation on the approval, or not of the proposed development (Section 8.7);
6. any conditions to which this statement is subjected (Section 10);
7. in the case of a linear activity, confirmation from the agricultural specialist or soil scientist, that in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase (Section 8.6);
8. where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr (Section 9); and
9. a description of the assumptions made and any uncertainties or gaps in knowledge or data (Section 5).

5 METHODOLOGY OF STUDY

5.1 Methodology for assessing the agro-ecosystem

This report adheres to the process and content requirements of the gazetted agricultural protocol as outlined in Section 3 above. As per the requirement, the assessment was based on a desktop analysis of existing soil and agricultural potential data for the site.

The following sources of information were used:

- Soil data was sourced from the land type data set, of the Department of Agriculture, Forestry and Fisheries (DAFF). This data set originates from the land type survey that was conducted from the 1970's until 2002. It is the most reliable and comprehensive national database of soil information in South Africa and although the data was collected some time ago, it is still entirely relevant as the soil characteristics included in the land type data do not change within time scales of hundreds of years.
- Land capability data was sourced from the 2017 National land capability evaluation raster data layer produced by the DAFF, Pretoria.
- Field crop boundaries were sourced from Crop Estimates Consortium, 2019. *Field Crop Boundary data layer, 2019*. Pretoria. Department of Agriculture, Forestry and

Fisheries.

- Rainfall and evaporation data was sourced from the SA Atlas of Climatology and Agrohydrology (2009, R.E. Schulze) available on Cape Farm Mapper.
- Grazing capacity data was sourced from the 2018 DAFF long-term grazing capacity map for South Africa, available on Cape Farm Mapper.
- Satellite imagery of the site and surrounds was sourced from Google Earth.

6 ASSUMPTIONS, UNCERTAINTIES OR GAPS IN KNOWLEDGE OR DATA

There are no specific assumptions, uncertainties or gaps in knowledge or data that affect the findings of this study.

7 SITE SENSITIVITY VERIFICATION

In terms of the gazetted agricultural protocol, a site sensitivity verification must be submitted that:

1. confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.;
2. contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity.

Agricultural sensitivity, in terms of environmental impact, and as used in the national web-based environmental screening tool, is a direct function of the capability of the land for agricultural production. This is because a negative impact, or exclusion of agriculture, on land of higher agricultural capability is more detrimental to agriculture than the same impact on land of low agricultural capability. The general assessment of agricultural sensitivity that is employed in the national web-based environmental screening tool, identifies all arable land that can support viable production of cultivated crops, as high (or very high) sensitivity. This is because there is a scarcity of arable production land in South Africa and its conservation for agricultural use is therefore a priority. Land which cannot support viable production of cultivated crops is much less of a priority to conserve for agricultural use, and is rated as medium or low agricultural sensitivity.

The screening tool classifies agricultural sensitivity according to only two independent criteria – the land capability rating and whether the land is cultivated or not. All cultivated land is classified as at least high sensitivity, based on the logic that if it is under cultivation, it is indeed suitable for cultivation, irrespective of its land capability rating.

The screening tool sensitivity categories in terms of land capability are based upon the Department of Agriculture's updated and refined, country-wide land capability mapping,

released in 2016. Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The higher land capability values (≥ 8 to 15) are likely to be suitable as arable land for the production of cultivated crops, while lower values are only likely to be suitable as non-arable, grazing land, or at the lowest extreme, not even suitable for grazing.

A map of the development footprint of the MTS and power line corridor, overlaid on the screening tool sensitivity, is given in Figure 3. In the MTS area, none of the land is classified as cultivated land, and agricultural sensitivity is therefore purely a function of land capability. The land capability of the footprint varies from 4 to 9. Values of 4 to 5 translate to a low agricultural sensitivity, values of 7 and 8 translate to medium agricultural sensitivity, and values of 9 translate to high agricultural sensitivity. There are only a few, isolated pixels of high sensitivity within the footprints. The small scale differences in land capability (pixels) across the project area are not very significant and are more a function of how the land capability data is generated by modelling, than actual meaningful differences in agricultural potential on the ground. The pixels of 9 are the result of the particular land type on the site, Ae46, having, on average, a higher soil potential than other surrounding land types. It is the land type on which most of the cultivation in the area is located. However, there are also shallow, non-arable soils within the land type. The land type modelling does not distinguish between different soils within a land type, but basically returns an average for the land type, which is further modified by terrain within that land type. Non-arable soils in an environment such as this one can be identified as the areas that have never been cultivated. They have not been cultivated because they are not suitable for cultivation.

The climate of the site (low rainfall of approximately 432 mm per annum and high evaporation of approximately 1,555 mm per annum) proves the area to be very marginal for crop production. It is only on the best soils within the area that crop production is at all viable.

The land capability of the MTS area, with non-arable soils and marginal climate, should have a maximum land capability of 6 and should therefore be of medium agricultural sensitivity.

There is land classified as cultivated land within the powerline corridor and therefore indicated as high agricultural sensitivity. However, cultivation has long since been abandoned, probably because it was too marginal, and so that land should no longer be classified as cultivated or be high agricultural sensitivity. This is of little importance because the power lines would have no impact on cultivated land, anyway.

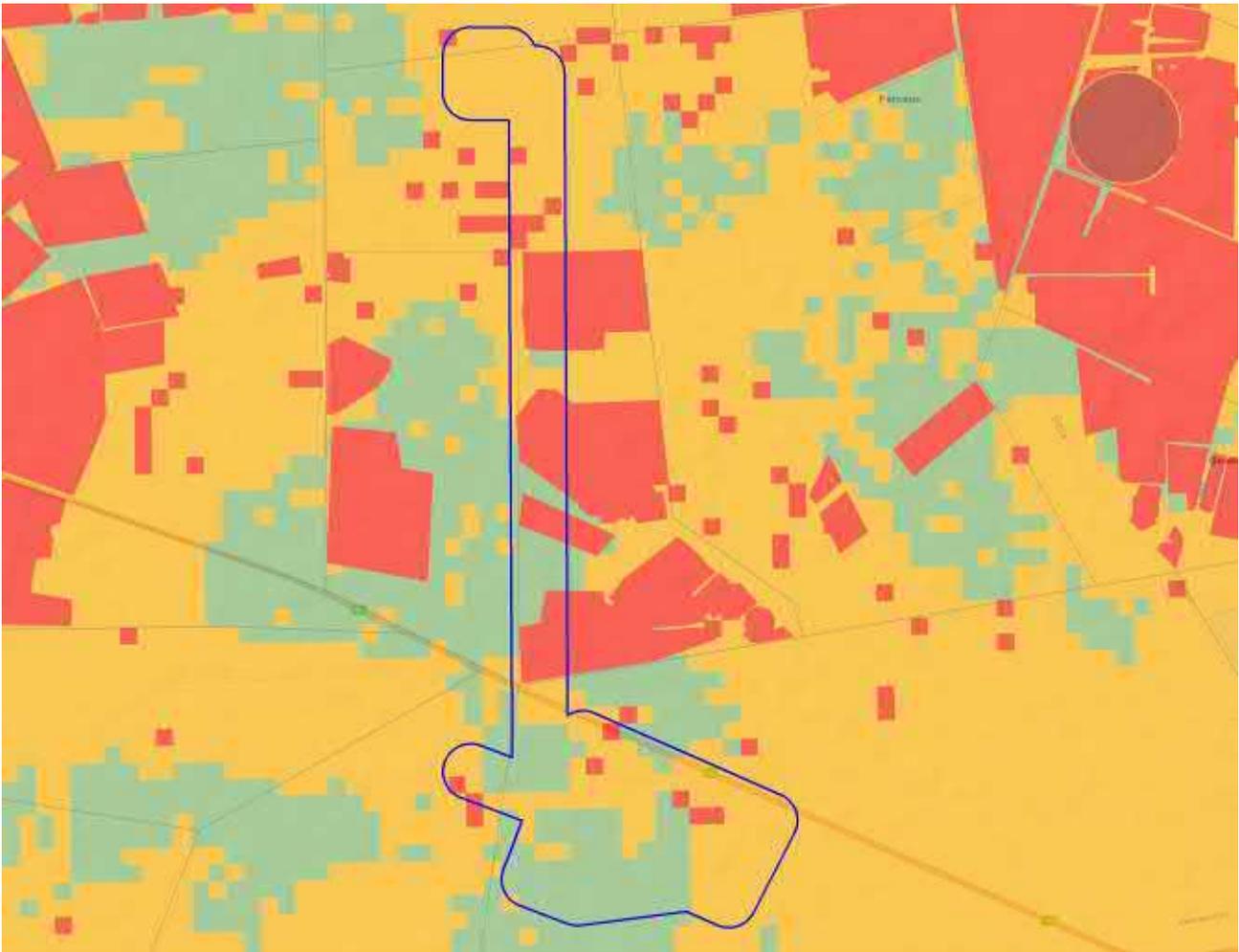


Figure 3. The footprint within which the proposed development will be located (blue outline) overlaid on agricultural sensitivity, as given by the screening tool (green = low; yellow = medium; red = high; dark red = very high). The MTS will be located within the area to the south of the R64 road. The footprint north of that is the power line corridor (see layout map in Figure 2).

Based on the above motivation, the high agricultural sensitivity, as identified by the screening tool, is disputed by this assessment. This site sensitivity verification verifies the entire site as being of less than high agricultural sensitivity. The required level of agricultural assessment is therefore confirmed as an Agricultural Compliance Statement.

8 AGRICULTURAL LAND USE

The site is used only as grazing land.

9 ASSESSMENT OF AGRICULTURAL IMPACT

9.1 Impact identification and discussion

The focus and defining question of an agricultural impact assessment is to determine to what extent a proposed development will compromise (negative impacts) or enhance (positive impacts) current and/or potential future agricultural production. The significance of an impact is therefore a direct function of the degree to which that impact will affect current or potential future agricultural production. If there will be no impact on production, then there is no agricultural impact.

It is important to consider the scale at which the significance of an impact is assessed. An agricultural impact equates to a temporary or permanent change in agricultural production potential of the land. The change in production potential of a farm or significant part of a farm will obviously always be highly significant at the scale of that farm, but may be much less so at larger scales. This assessment considers a regional and national scale to be the most appropriate one for assessing the significance of the loss of agricultural production potential.

The exact nature of the different infrastructure within a development has very little bearing on the significance of agricultural impacts. Whether the footprint comprises a solar panel, a road or a substation is largely irrelevant to agricultural impact. What is of most relevance is simply the total footprint of the facility that excludes agricultural land use or impacts agricultural land. Powerlines have negligible agricultural impact because all agricultural activities that are viable in this environment, can continue completely unhindered underneath powerlines. This includes a service track under the powerline which will also have minimal impact. The direct, permanent, physical footprint of a power line that has any potential to interfere with agriculture, is of very limited extent and therefore entirely insignificant within this agricultural environment.

Only a single agricultural impact has been identified by this assessment, namely:

- **Loss of agricultural potential by occupation of land** - Agricultural land directly occupied by the development infrastructure, that is the approximately 64 hectares of the MTS, will become unavailable for agricultural use, with consequent potential loss of agricultural productivity. This impact is relevant only in the construction phase. No further loss of agricultural land use occurs in subsequent phases.

9.2 Cumulative impacts

The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities that will affect the same environment. It is important to note that the cumulative impact assessment for a particular project, like what is being done here, is not the same as an assessment of the impact of all surrounding projects. The cumulative assessment for this project is an assessment only of the impacts associated

with this project, but seen in the context of all surrounding impacts. It is concerned with this project's contribution to the overall impact, within the context of the overall impact.

The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

The potential cumulative agricultural impact of importance is a regional loss (including by degradation) of agricultural land, with a consequent decrease in agricultural production. The defining question for assessing the cumulative agricultural impact is this:

What level of loss of agricultural land use and associated loss of agricultural production is acceptable in the area, and will the loss associated with the proposed development, when considered in the context of all past, present or reasonably foreseeable future impacts, cause that level in the area to be exceeded?

DFFE requires compliance with a specified methodology for the assessment of cumulative impacts. This is positive in that it ensures engagement with the important issue of cumulative impacts. However, the required compliance has some limitations and can, in the opinion of the author, result in an over-focus on methodological compliance, while missing the more important task of effectively answering the above defining question.

DFFE compliance for this project requires considering all renewable energy projects within a 30 km radius. There are 22 such solar PV projects (see Appendix 3).

Solar PV projects are all located on land that is not suitable for cultivation. In quantifying the cumulative impact, the area of such land taken out of agriculture as a result of these 22 projects plus this one, (total generation capacity of 2,000 MW) will amount to a total of approximately 5,025 hectares. This is calculated using the industry standards of 2.5 and 0.3 hectares per megawatt for solar and wind energy generation respectively, as per the Department of Environmental Affairs (DEA) Phase 1 Wind and Solar Strategic Environmental Assessment (SEA) (2015). As a proportion of the total area within a 30km radius (approximately 282,700 ha), this amounts to only 1.78% of the surface area. That is considered to be within an acceptable limit in terms of loss of agricultural land that is only suitable for grazing, of which there is no scarcity in the country. This is particularly so when considered within the context of the following point:

In order for South Africa to achieve its renewable energy generation goals, agriculturally zoned land will need to be used for renewable energy generation. It is far more preferable

to incur a cumulative loss of agricultural land which has no cultivation potential, than to lose agricultural land that has a higher potential, and that is much scarcer, to renewable energy development elsewhere in the country. The limits of acceptable agricultural land loss are far higher in this region than in regions with higher agricultural potential.

There are no significant other land uses, apart from renewable energy, that are competing for agricultural land in the area, and so the total cumulative loss of agricultural land from all competing land uses is not significantly higher than what has been considered above.

Due to all of the considerations discussed above, the cumulative impact of loss of agricultural land use will not have an unacceptable negative impact on the agricultural production capability of the area. The proposed development is therefore acceptable in terms of cumulative impact, and it is therefore recommended that it is approved.

9.3 Comparative assessment of alternatives

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 or powerline corridor alternatives are therefore being considered and assessed.

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.

9.4 Impacts of the no-go alternative

The no-go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. There is no agricultural impact of the no-go option and the development involves a loss of 64 hectares of agricultural land, so from an isolated agricultural land loss perspective, the no-go is the preferred option. However, the no-go would prevent the proposed development plus the dependent renewable energy

developments from contributing to the environmental, social and economic benefits associated with the development of renewable energy in the area.

9.5 Micro-siting to minimize fragmentation and disturbance of agricultural activities

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities. However, the agricultural uniformity and low potential and the nature of the agricultural impact mean that the exact positions of all infrastructure will not make any material difference to agricultural impacts.

9.6 Confirmation of linear activity impact

The protocol provision of a linear impact confirmation only makes sense when the requirement for an Agricultural Compliance Statement is based on the fact that the development is a linear activity. In this case the medium agricultural sensitivity determines that an Agricultural Compliance Statement suffices, anyway, even for non-linear activities.

9.7 Impact assessment and statement

Although an Agricultural Compliance Statement is not required to formally rate agricultural impacts, it is hereby confirmed that the agricultural impact of the proposed development is very low. An Agricultural Compliance Statement is only required to indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site. It must provide a substantiated statement on the acceptability, or not, of the proposed development and a recommendation on the approval, or not of the proposed development.

The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. The proposed development is therefore acceptable. This is substantiated by the following points:

- The agricultural footprint of the proposed development will occupy land that is of limited land capability and is not suitable for the production of cultivated crops. There is not a scarcity of such agricultural land in South Africa and its conservation for agriculture is not therefore a priority.
- The location of the MTS and BESS is in keeping with the allowable development limits prescribed by the agricultural protocol. These limits reflect the national need to conserve valuable agricultural land and therefore to steer, particularly renewable energy developments, onto land with low agricultural production potential.

- Powerlines have insignificant agricultural impact in the agricultural environment of the project.

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

10 ENVIRONMENTAL MANAGEMENT PROGRAMME INPUTS

There are no additional mitigation measures required, over and above what has already been included in the Generic EMP for overhead electricity transmission and distribution infrastructure as per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019.

11 CONCLUSIONS

The site has low agricultural potential because of soil and climate constraints and is therefore unsuitable for cultivated crop production. Agricultural land use is limited to grazing. The site has been assessed as being of medium agricultural sensitivity.

Only one negative agricultural impact was identified, namely loss of agricultural potential by occupation of 64 hectares of land.

The conclusion of this assessment is that the proposed development will have very low agricultural impact and will be acceptable in terms of its impact on the agricultural production capability of the site. This is substantiated by the fact that the loss is of agricultural land of low potential that is only suitable as grazing land.

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

The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions.

12 REFERENCES

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Crop Estimates Consortium, 2019. *Field Crop Boundary data layer, 2019*. Pretoria. Department of Agriculture, Forestry and Fisheries.

Department of Agriculture, Forestry and Fisheries, 2017. National land capability evaluation raster data layer, 2017. Pretoria.

Department of Agriculture, Forestry and Fisheries, 2002. National land type inventories data set. Pretoria.

Schulze, R.E. 2009. SA Atlas of Climatology and Agrohydrology, available on Cape Farm Mapper. Available at: <https://gis.elsenburg.com/apps/cfm/>

APPENDIX 1: SPECIALIST CURRICULUM VITAE

Johann Lanz Curriculum Vitae

Education

M.Sc. (Environmental Geochemistry)	University of Cape Town	1996 - 1997
B.Sc. Agriculture (Soil Science, Chemistry)	University of Stellenbosch	1992 - 1995
BA (English, Environmental & Geographical Science)	University of Cape Town	1989 - 1991
Matric Exemption	Wynberg Boy's High School	1983

Professional work experience

I have been registered as a Professional Natural Scientist (Pri.Sci.Nat.) in the field of soil science since 2012 (registration number 400268/12) and am a member of the Soil Science Society of South Africa.

Soil & Agricultural Consulting Self employed 2002 - present

In the past 5 years of running my soil and agricultural consulting business, I have completed more than 120 agricultural assessments (EIAs, SEAs, EMPRs) in all 9 provinces for renewable energy, mining, urban, and agricultural developments. My regular clients include: Aurecon; CSIR; SiVEST; Arcus; SRK; Environamics; Royal Haskoning DHV; Jeffares & Green; JG Afrika; Juwi; Mainstream; Redcap; G7; Mulilo; and Tiptrans. Recent agricultural clients for soil resource evaluations and mapping include Cederberg Wines; Western Cape Department of Agriculture; Vogelfontein Citrus; De Grendel Estate; Zewenwacht Wine Estate; and Goedgedacht Olives.

In 2018 I completed a ground-breaking case study that measured the agricultural impact of existing wind farms in the Eastern Cape.

Soil Science Consultant Agricultural Consultants International (Tinie du Preez) 1998 - 2001

Responsible for providing all aspects of a soil science technical consulting service directly to clients in the wine, fruit and environmental industries all over South Africa, and in Chile, South America.

Contracting Soil Scientist De Beers Namaqualand Mines July 1997 - Jan 1998

Completed a contract to advise soil rehabilitation and re-vegetation of mined areas.

Publications

- Lanz, J. 2012. Soil health: sustaining Stellenbosch's roots. In: M Swilling, B Sebitosi & R Loots (eds). *Sustainable Stellenbosch: opening dialogues*. Stellenbosch: SunMedia.
- Lanz, J. 2010. Soil health indicators: physical and chemical. *South African Fruit Journal*, April / May 2010 issue.
- Lanz, J. 2009. Soil health constraints. *South African Fruit Journal*, August / September 2009 issue.
- Lanz, J. 2009. Soil carbon research. *AgriProbe*, Department of Agriculture.
- Lanz, J. 2005. Special Report: Soils and wine quality. *Wineland Magazine*.

I am a reviewing scientist for the *South African Journal of Plant and Soil*.



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

APPENDIX 2: DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

(For official use only)

File Reference Number:

NEAS Reference Number:

Date Received:

DEA/EIA/

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:

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- A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
- 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.
- 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

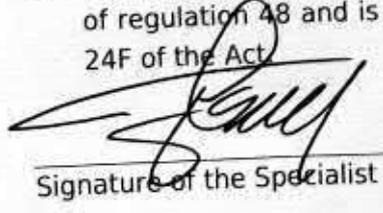
1. SPECIALIST INFORMATION

Specialist Company Name: B-BBEE	Johann Lanz – Soil Scientist		
Specialist name:	Johann Lanz		
Specialist Qualifications:	M.Sc. (Environmental Geochemistry)		
Professional affiliation/registration:	Registered Professional Natural Scientist (Pr. Sci. Nat.) Reg. no. 400268/12 Member of the Soil Science Society of South Africa		
Physical address:	1a Wolfe Street, Wynberg, Cape Town, 7800		
Postal address:	1a Wolfe Street, Wynberg, Cape Town, 7800		
Postal code:	7800	Cell:	082 927 9018
Telephone:	082 927 9018	Fax:	Who still uses a fax? I don't
E-mail:	johann@johannlanz.co.za		

2. DECLARATION BY THE SPECIALIST

I, **Johann Lanz**, 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

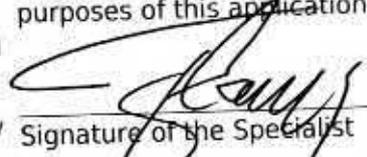
Johann Lanz - Soil Scientist (sole proprietor)

Name of Company:
26/09/2021
Date Kwazulu Natal MASIBULOLE

Details of Specialist, Declaration and Undertaking Under Oath

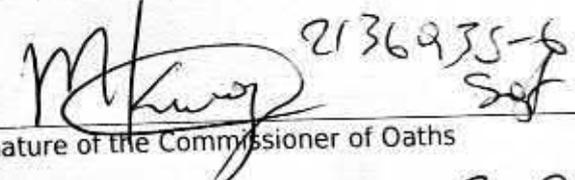
3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, **Johann Lanz**, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.


Signature of the Specialist

Johann Lanz - Soil Scientist (sole proprietor)
Name of Company

26/09/2021
Date

 2136935-6
Signature of the Commissioner of Oaths

2021-09-2021
Date



APPENDIX 3: PROJECTS CONSIDERED FOR CUMULATIVE IMPACT ASSESSMENT

List of projects considered for cumulative impact assessment.

1. 100 MW Kentani PV - 14/12/16/3/3/2/724
2. 100 MW Klipfontein PV - 14/12/16/3/3/2/722
3. 100 MW Braklaagte PV - 14/12/16/3/3/2/727
4. 100 MW Meeding PV - 14/12/16/3/3/2/719
5. 100 MW Irene PV - 14/12/16/3/3/2/718
6. 100 MW Leliehoek PV - 14/12/16/3/3/2/728
7. 75 MW Sonoblomo PV - 14/12/16/3/3/2/723
8. 75 MW Klipfontein PV 2 - 14/12/16/3/3/2/726
9. 75 MW Braambosch PV - 14/12/16/3/3/2/725
10. 75 MW Boschrand PV 2 - 14/12/16/3/3/2/720
11. 75 MW Eksteen PV - 14/12/16/3/3/2/717
12. 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
13. Klipbult solar plant - 14/12/16/3/3/2/432
14. 75 MW Sebina Letsatsi Solar PV Facility - 14/12/16/3/3/2/755
15. 100 MW Edison PV Solar Facility and shared electricity Infrastructure - 14/12/16/3/3/2/851
16. 100 MW Maxwell PV Solar Facility and shared electricity Infrastructure - 14/12/16/3/3/2/852
17. 100 MW Marconi PV solar projects and associated infrastructure - 14/12/16/3/3/2/853
18. 100 MW Watt PV solar projects and associated infrastructure - 14/12/16/3/3/2/854
19. 100 MW Faraday PV solar projects and associated infrastructure - 14/12/16/3/3/2/855
20. 100 MW Visserpan solar photovoltaic facility project 2 - 14/12/16/3/3/1/2154
21. 100 MW Visserpan solar photovoltaic facility project 3 - 14/12/16/3/3/1/2155
22. 100 MW Visserpan solar photovoltaic facility project 4 - 14/12/16/3/3/1/2156

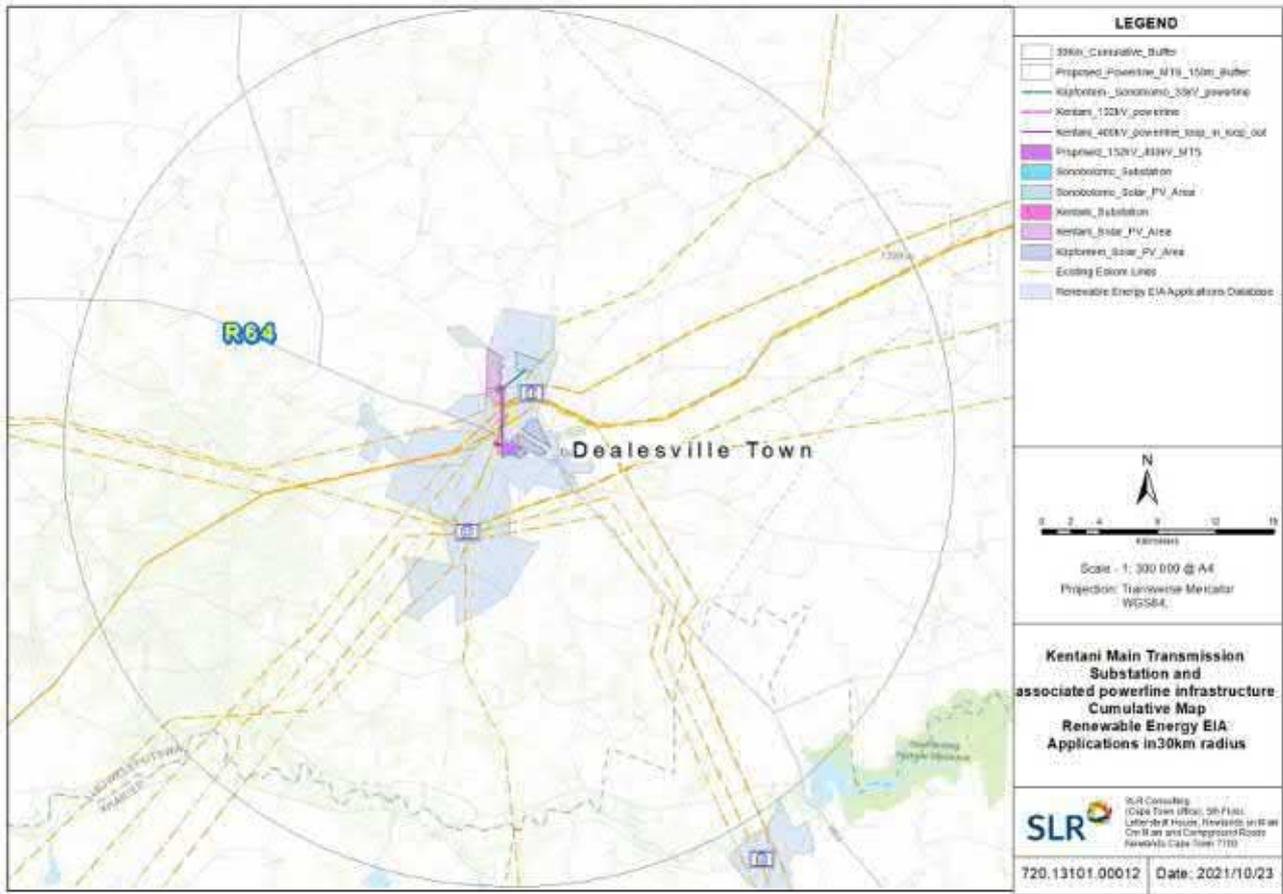


Figure 4. Projects considered for cumulative impact assessment.

Aquatic



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

SURFACE WATER IMPACT ASSESSMENT

DFFE Reference: To be Allocated
Report Prepared by: EnviroSci (Pty) Ltd
Issue Date: 14 November 2021
Version No.: 1

EXECUTIVE SUMMARY

EnviroSci (Pty) has been appointed by SLR South Africa Consulting (PTY) Ltd, of South Africa Mainstream Renewable Power Developments (Pty) Ltd, hereafter referred to as “Mainstream”, to undertake a surface water impact assessment for the proposed addition of one (1) Main Transmission Substation (MTS), three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines) and a 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 nature of the substations and transmission lines are such that they carry low intensity impact on aquatic resources. This however this assumes that the HIGH sensitivity systems are spanned and or avoided by the proposed structures.

The study area contained a variety of aquatic features mainly associated with the Depression / Pan Hydrogeomorphic class of aquatic / wetlands systems found within the greater region. These ranged >1ha to 8ha in size. Similarly, some of these could include freshwater habitats, while the larger systems were dominated by saline soils and / or water columns (when inundated).

The other aquatic features observed were as follows:

- Non perennial rivers with or without riparian vegetation. These ranged from narrow channels to broad er flood plain areas in the lower valleys. However, broad riparian zones were only found within the lower valley areas, dominated by a small number of trees, while obligate instream vegetation is limited to a small number of sedges (nut grasses). None of these were located within the proposed development footprint areas.
- Minor drainage lines, with no obligate aquatic vegetation.
- Dams with no wetland or aquatic features mostly used for watering of livestock. Several pans previously assessed in the 2014/2015 assessments was converted into dams but still contain wetland elements.

Little in the way of drainage occurs within the development areas, thus the number of water course were limited. These that do occur drain, forming part of a tributary of the Modder River, associated with the C52 h and C52K Quinary Catchments of the Highveld Ecoregion in the Orange Catchment Management Agency. Due to this limited connectivity via watercourses, the study area was not included in any National Freshwater Ecosystems Priority Areas (NFEPAs) or Strategic Water Resource Areas, although due to the presence of the pans, the pans in the region were included into National Wetland Cluster, NSBA (2018) spatial layers.

With regard the proposed buffers (50m), none of the proposed infrastructure (substation sites and gird corridors), will be affected.

All the systems assessed by DWS (2014) on a Subquaternary level within the study area were rated as PES = D or Largely Modified within the greater region (SQ3155). While these were also rated as High in terms of Ecological Sensitivity and High in terms of Ecological Importance respectively.

Based on the information collected during the field investigations, these ratings are verified and upheld for the riverine systems. Overall, these catchment areas and subsequent rivers / watercourses are in a natural state with localised impacts in some areas, which include the following:

- Erosion and sedimentation associated with existing road crossings; and

- Impeded water flow due to several in channel farm dams or weirs.

The pans and depression, range from PES = B (Largely natural) to C (Moderately Modified), link to changes to their catchments being modified by agricultural encroachment.

The DFFE screening tool indicated that several Very High aquatic sensitivity features were located within the greater region (pans), while the remainder of the areas (MTS) were rated a Medium.

The presence of these Very High Sensitivity features was confirmed during this assessment (See Appendix 2 for Verification Statement), as delineated in this assessment.

The study area is also not located within an International Bird Area (IBA) or a Strategic Water Resource Area but is located within a listed Threatened Ecosystems.

With regards impacts, these systems are large influence by changes to any hydrological regimes and direct disturbance. Secondary impacts are most related to water quality (spills) and the increase in surface flows presented by hard surfaces. This if no stormwater management is provided then results in erosion and sedimentation. Although it may be argued erosion and sediment transport is a natural phenomenon within these systems, acceleration of these natural process quickly results in scour and donga formation.

The following impacts were then assessed, which are aligned with those contained in the Biodiversity Assessment Protocol and include in the table below and assessed against the proposed alignment and potential activities:

Biodiversity Assessment Protocol Impacts found applicable to this project	Impacts assessed in this report below
Faunal and vegetation communities inhabiting the site	Impact 1 and 2
Fragmentation (physical loss of ecological connectivity = Wetland cluster)	Impact 1 and 2
Changes in numbers and density of species	Impact 1 and 2
Water quality changes (increase in sediment, organic loads, chemicals or eutrophication)	Impact 3
Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)	Impact 4
Streamflow regulation	Impact 2
Erosion control	Impact 4
Cumulative Impacts	Impact 5

As highlighted above the following impacts on the aquatic environment have been identified and will be assessed in greater detail as follows, as well as separately the No-Go and Cumulative impacts:

Construction & Decommissioning Phases

- Impact 1: Loss of aquatic species of special concern
- Impact 2: Damage or loss of riparian systems and disturbance of the waterbodies in the construction phase
- Impact 3: Potential impact on localised surface water quality

Operational phase

- Impact 4: Impact on aquatic systems through the possible increase in surface water runoff on form and function - Increase in sedimentation and erosion.

The nature of the substations and transmission lines are such that they carry low intensity impact on aquatic resources. This however this assumes that the No-Go areas and Very High sensitivity systems are spanned and or avoided by the proposed structures.

A variety of aquatic features, mostly ephemeral in nature were observed within the study area and these were mapped and buffered as necessary for their protection. The current layout has avoided these sensitive features and buffer areas, negating the potential overall impact and risk to Aquatic resources.

The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance. Overall, it is expected that the impact on the aquatic environment would be Very Low (-).

Based on the findings of this study, the specialist finds no reason to withhold to an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented. A key recommendation is also that that during the later design process, that the temporary construction camps and or substations as required be located outside of the aquatic systems and the associated buffer

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;	Appendix 1 CV
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Attached to Report
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1 of this report
(cA) an indication of the quality and age of base data used for the specialist report;	Section 1.3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 5
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 1.3 and 5
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Appendix 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 & 6
g) an identification of any areas to be avoided, including buffers;	Section 5 & 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;	Section 5
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.4
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 6 & 8
k) any mitigation measures for inclusion in the EMPr;	Section 7

l) any conditions for inclusion in the environmental authorisation;	Section 5. 6 and 8
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 7
n) a reasoned opinion- <ul style="list-style-type: none"> i. (as to) whether the proposed activity, activities or portions thereof should be authorised; <ul style="list-style-type: none"> (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 8
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.	Yes - Appendix 2



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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

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

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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

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GLOSSARY OF TERMS

- **Drainage line:** A drainage line is a lower category or order of watercourse that does not have a clearly defined bed or bank. It carries water only during or immediately after periods of heavy rainfall i.e. non-perennial, and riparian vegetation may not be present.
- **Perennial and non-perennial:** Perennial systems contain flow or standing water for all or a large proportion of any given year, while non-perennial systems are episodic or ephemeral and thus contains flows for short periods, such as a few hours or days in the case of drainage lines.
- **Riparian:** the area of land adjacent to a stream or river that is influenced by stream-induced or related processes. Riparian areas which are saturated or flooded for prolonged periods would be considered wetlands and could be described as riparian wetlands. However, some riparian areas are not wetlands (e.g. an area where alluvium is periodically deposited by a stream during floods but which is well drained).
- **Wetland:** land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil (Water Act 36 of 1998); land where an excess of water is the dominant factor determining the nature of the soil development and the types of plants and animals living at the soil surface (Cowardin *et al.*, 1979).
- **Water course:** as per the National Water Act means -
 - (a) a river or spring;
 - (b) a natural channel in which water flows regularly or intermittently;
 - (c) a wetland, lake or dam into which, or from which, water flows; and
 - (d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks

LIST OF ABBREVIATIONS

CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CSIR	Council for Scientific and Industrial Research
DWS	Department of Water and Sanitation formerly the Department of Water Affairs
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
ESA	Ecological Support Area
GA	General Authorisation (WUA type)
GIS	Geographic Information System
NFEPA	National Freshwater Ecosystem Priority Atlas (Nel, <i>et al.</i> 2011).
OHL	Overhead Line – transmission line cable that is not buried
ORC	Off road cable – underground or overhead transmission cable not within a road reserve
PES	Present Ecological State
SANBI	South African National Biodiversity Institute
SQ	Subquaternary catchment
WUA	Water Use Authorisation
WUL	Water Use License
WULA	Water Use License Application

1. INTRODUCTION

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing the development of (1) Main Transmission Substation (MTS) and three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines), Li-Ion Battery Energy Storage System, the associated electrical infrastructure, (the 'proposed development') that will connect to the authorised Solar Energy Facilities i.e. Kentani, Klipfontein, Klipfontein 2, Leliehoek, Sonoblomo, Braklaagte, Boschrand 2, Meeding, Irene and Braambosch, collectively known as the Kentani Cluster located near the town of Dealesville, Tokologo Local Municipality (Lejweleputswa District) in the Free State Province. The proposed development will also involve the re-routing of eight (8) 132kV powerlines within the grid connection corridor which has been authorised as part of the Kentani Cluster, making provision for this routing in the new proposed MTS (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 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

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).

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.

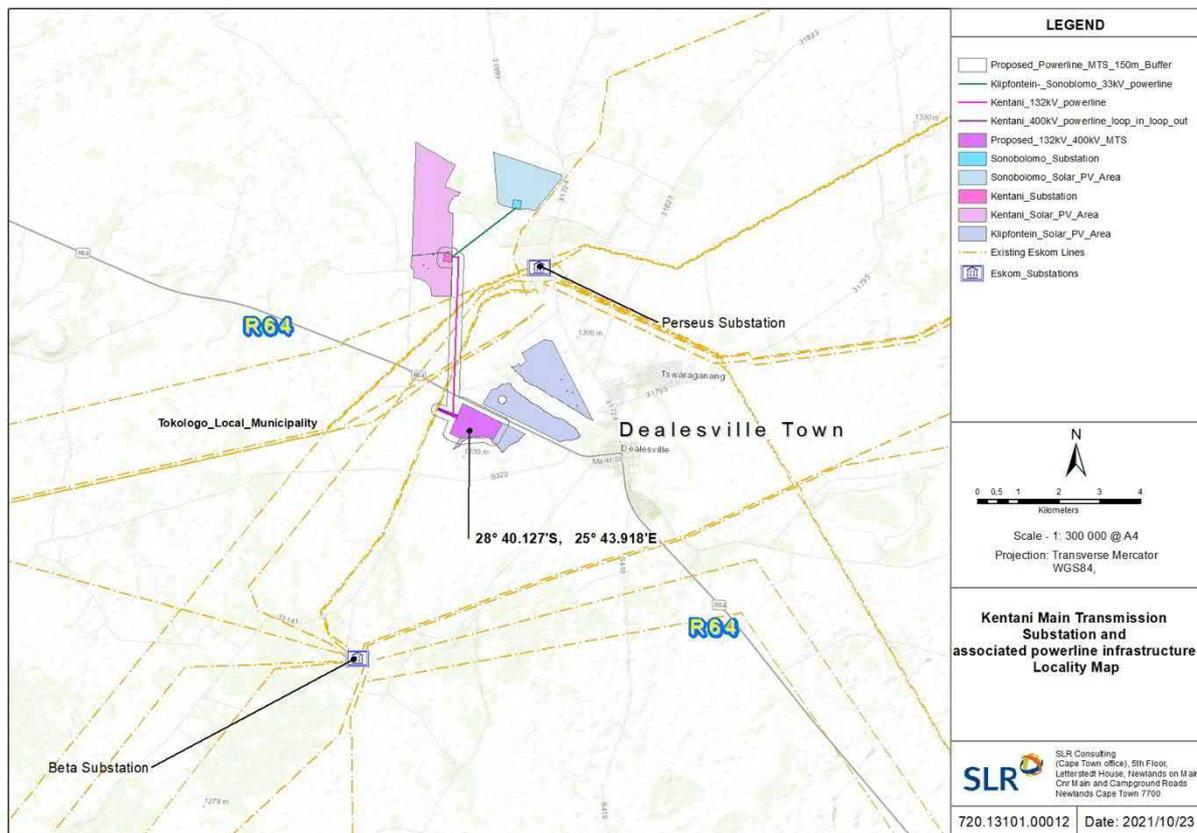


Figure 1:Regional context map

2. ASSESSMENT METHODOLOGY

1.1 Specialist Credentials

Please see Appendix 1 (Specialist CVs)

1.2 Terms of Reference (ToR)

The proposed methods used in this assessment have been developed with the renewable industry in mind, coupled to the minimum requirements stipulated by DFFE and the Department of Water and Sanitation. These have been successful in assessing the direct, indirect and cumulative impacts of 128 renewable energy projects (2010 – 2021), of which 18 have been constructed.

Therefore the surface water and aquatic biodiversity site sensitivity screening, field investigations and impact assessment has included the following:

- Desktop analysis
- Site investigation
- Compilation of one draft and one final report for the project which adheres to the following (this list is not exhaustive):
 - The Initial Site Sensitivity Verification reporting requirements for environmental themes set out in Government Gazette No. 43110 which was promulgated on 20 March 2020 in terms of section 24(5)(a) and (h) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) (Appendix 2).
 - Identification and mapping of any discrepancies with the environmental sensitivity as identified on the national web based environmental screening tool.
 - Identification of sensitive areas to be avoided (including corresponding spatial data) and the determination of the respective buffers (if applicable) for each site.
 - Initial recommendations for the layout and allowable development footprint from a surface water and aquatic biodiversity perspective (including corresponding spatial data).
 - Recommendations regarding the areas to be utilised for wind and solar technologies within the project site from a surface water and aquatic biodiversity perspective (including corresponding spatial data)

1.3 Approach

These assessments were conducted using the following assessment process based on 2 days field work conducted in September 2021 and again in October 2021 after heavy rainfalls after a significantly long dry period experienced in the region.

Methodology summary (Detailed approach is shown in Appendix 3)

- Initiated the assessment with a review of the available information for the region and the proposed project, this will also include review of the proposed project in relation to any conservation plans or assessments known for the area, e.g. Critical Biodiversity Area maps, National Waterbody Inventory and high-level groundwater availability maps etc.
- Conducted a site visit (September / October 2021) to inspect the surrounding waterbodies / features, to develop maps.
- Prepared a map demarcating the respective watercourses or wetland/s, i.e. the waterbody, its respective catchment and other areas within a 500m radius of the study area. This demonstrated, from a holistic point of view the connectivity between the site and the surrounding regions, i.e. the hydrological zone of influence while classifying the hydrogeomorphic type of the respective water courses / wetlands in relation to present land-use and their current state. The maps depicting demarcated waterbodies were delineated to a scale of 1:10 000, following the methodology described by the DWS, together with an estimation of their functionality, Habitat Integrity (IHI), Wet-Ecosystems (Wet-Health) and Socio-Cultural Importance of the delineated systems, whichever is relevant to the systems.
- Recommended buffer zones using the Macfarlane & Bredin (2017) approach to indicate any No-go / Sensitive areas around any delineated aquatic zones supported by any relevant legislation, e.g., any bioregional plans, conservation guidelines or best practice.
- Determined the Present Ecological State (PES) of any waterbodies including wetlands, estimating their biodiversity, conservation importance with regard ecosystem services during the site visit using recognised PES / EIS assessment methods to determine the state, importance and sensitivity of the respective wetland / watercourse systems.
- Identified and assessed the potential impacts of the proposed project using the revised project layout and description, based on a supplied impact assessment methodology (provided by Aurecon), including cumulative impacts and for construction, operation and decommissioning phases. Also assess the potential impact of the “no go” alternative.

- Provided recommendations and mitigations regarding project related impacts for inclusion into the Environmental Management Program (EMPr).
- Supplied the client with geo-referenced GIS shape files of the wetland / riverine areas and associated buffers to be used in the finalisation of the project layout and management of the project going forward.
- Provided a separate Risk Assessment Matrix as per the DWS 2016 requirements to determine the Water Use License Application Requirements, i.e., indication of future permitting requirements

1.4 Assumptions and Limitations

To obtain a comprehensive understanding of the dynamics of both the flora and fauna of communities within a study site, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and through replication. However, due to time constraints these long-term studies are not feasible and are thus mostly based on instantaneous sampling. This limitation is common to many impact assessment type studies, but the findings are deemed adequate for the purposes of decision-making support regarding project acceptability, unless otherwise stated.

Therefore, due to the scope of the work presented in this report, a long-term investigation of the proposed site was not possible and as such not perceived as part of the Terms of Reference. However, a concerted effort was made to sample and assess as much of the potential site, as well as make use of any supporting literature, species distribution data and aerial photography.

It should be emphasised that information, as presented in this document, only has reference to the study area as indicated on the accompanying maps. Therefore, this information cannot be applied to any other area without detailed investigation.

3. LEGAL REQUIREMENT AND GUIDELINES

The following is pertinent to this study:

- Section 24 of The Constitution of the Republic of South Africa;
- Agenda 21 – Action plan for sustainable development of the Department of Environmental Affairs and Tourism (DEAT) 1998;
- National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) inclusive of all amendments, as well as the NEM: Biodiversity Act;
- National Water Act, 1998 (Act No. 36 of 1998);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002);
- National Forest Act (No. 84 of 1998); and
- National Heritage Resources Act (No. 25 of 1999) – could apply if cultural use or heritage is linked to any aquatic resources

NEMA and the CARA identify and categorise invasive plants together with associated obligations on the landowner. Several Category 1 & 2 invasive plants were observed in several areas of the site under investigation.

Based on an assessment of the proposed activities (Table 1) and past engagement with DWS, the following Water Use Authorisations may be required based on the following thresholds as listed in the following Government Notices, however ultimately the Department of Water and Sanitation (DWS) must determine if a General Authorisation (GA) or full WULA will be required during the pre-application process as it relates to the following, bearing in mind that this will only be conducted once a final project scope is known:

- **DWS Notice 538 of 2016, 2 September in GG 40243**– Section 21a water uses relating to the Abstraction of water.

- **Government Notice 509 in GG 40229 of 26 August 2016** – Section 21c & 21i water uses relating to the Impeding or diverting the flow of water in a watercourse and or altering the bed, banks, course or characteristics of a watercourse.
- **Government Notice 665, 6 September 2013 in GG 36820** - Section 21g relating to disposing of waste in a manner that may detrimentally impact on a water source which includes temporary storage of domestic wastewater i.e. conservancy tanks under Section 37 of the notice.

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);
- The Farm Overschot No. 31 (F0040000000003100000)
- Remainder of the Farm Oxford No. 1030 (F00400000000103000000);
- Portion 1 of the Farm Walkerville No. 1031 (F00400000000103100001)²; and
- Remainder of the Farm Walkerville No. 1031 (F00400000000103100000)².

The proposed MTS 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 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 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 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 2016¹

4.2 Project components

The proposed development involves the addition of one (1) MTS 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.

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.

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 have a capacity of 132kV/400kV and will occupy a footprint of approximately 64ha (i.e., 800m x 800m).

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) will 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 not 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: Summary of the key project components

Project Components	Location and size / extent (i.e., Farm Names and Areas)
Location	<ul style="list-style-type: none"> • Remaining Extent of the Farm Klipfontein No. 305 - F0040000000030500000 • 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 - F0040000000003100000
Onsite Main Transmission Substation (MTS)	<ul style="list-style-type: none"> • 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 2016¹) 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 (<u>14/12/16/3/3/2/722</u>), which is proposed on Remaining Extent of the Farm Klipfontein No. 305
Grid Connection (Powerlines)	<ul style="list-style-type: none"> • 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 (<u>14/12/16/3/3/2/724</u>) (approx. 4km north-west of MTS site); • One (1) new 33kV overhead powerline connecting authorised 75MW Sonoblomo PV facility (<u>14/12/16/3/3/2/723</u>) (approx. 5km north of MTS site) to authorised Kentani on-site substation (<u>14/12/16/3/3/2/724</u>) (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

	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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:

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 Sonobloomo 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 not trigger the need for an Application for Environmental Authorisation, however, the powerline has been considered by the specialist team.

The site layout being proposed is shown in the figure below (Figure 2).

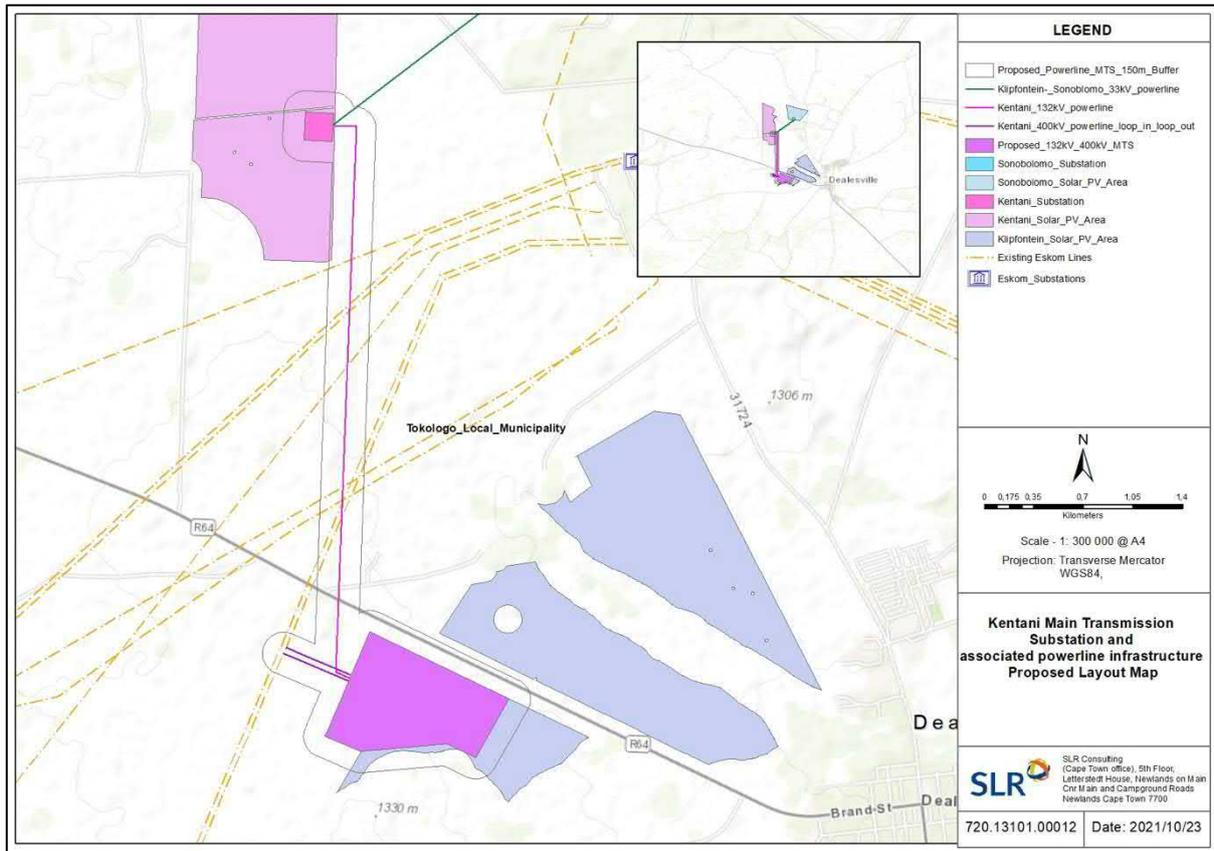


Figure 2: Proposed layout

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 study area contained a variety of aquatic features mainly associated with the Depression / Pan Hydrogeomorphic class of aquatic / wetlands systems found within the greater region. These ranged >1ha to 8ha in size. (Plate 5.1). Similarly, some of these could include freshwater habitats, while the larger systems were dominated by saline soils and / or water columns (when inundated).

The other aquatic features observed were as follows (Figure 3):

- Non perennial rivers with or without riparian vegetation. These ranged from narrow channels to broad er flood plain areas in the lower valleys. However, broad riparian zones were only found within the lower valley areas, dominated by a small number of trees, while obligate instream vegetation is limited to a small number of sedges (nut grasses). None of these were located within the proposed development footprint areas.
- Minor drainage lines (Plate 5.2), with no obligate aquatic vegetation.
- Dams with no wetland or aquatic features mostly used for watering of livestock. Several pans previously assessed in the 2014/2015 assessments was converted into dams but still contain wetland elements (Figure 5.1)

Little in the way of drainage occurs within the development areas, thus the number of water course were limited. These that do occur drain, forming part of a tributary of the Modder River, associated with the C52 h and C52K Quinary Catchments of the Highveld Ecoregion in the Orange Catchment Management Agency (Figure 5.2). Due to this limited connectivity via watercourses, the study area was not included in any National Freshwater Ecosystems Priority Areas (NFEPAs) or Strategic Water Resource Areas, although due to the presence of the pans, the pans in the region were included into National Wetland Cluster, NSBA (2018) spatial layers.

With regard the proposed buffers (50m), none of the proposed infrastructure (substation sites and gird corridors), will be affected.

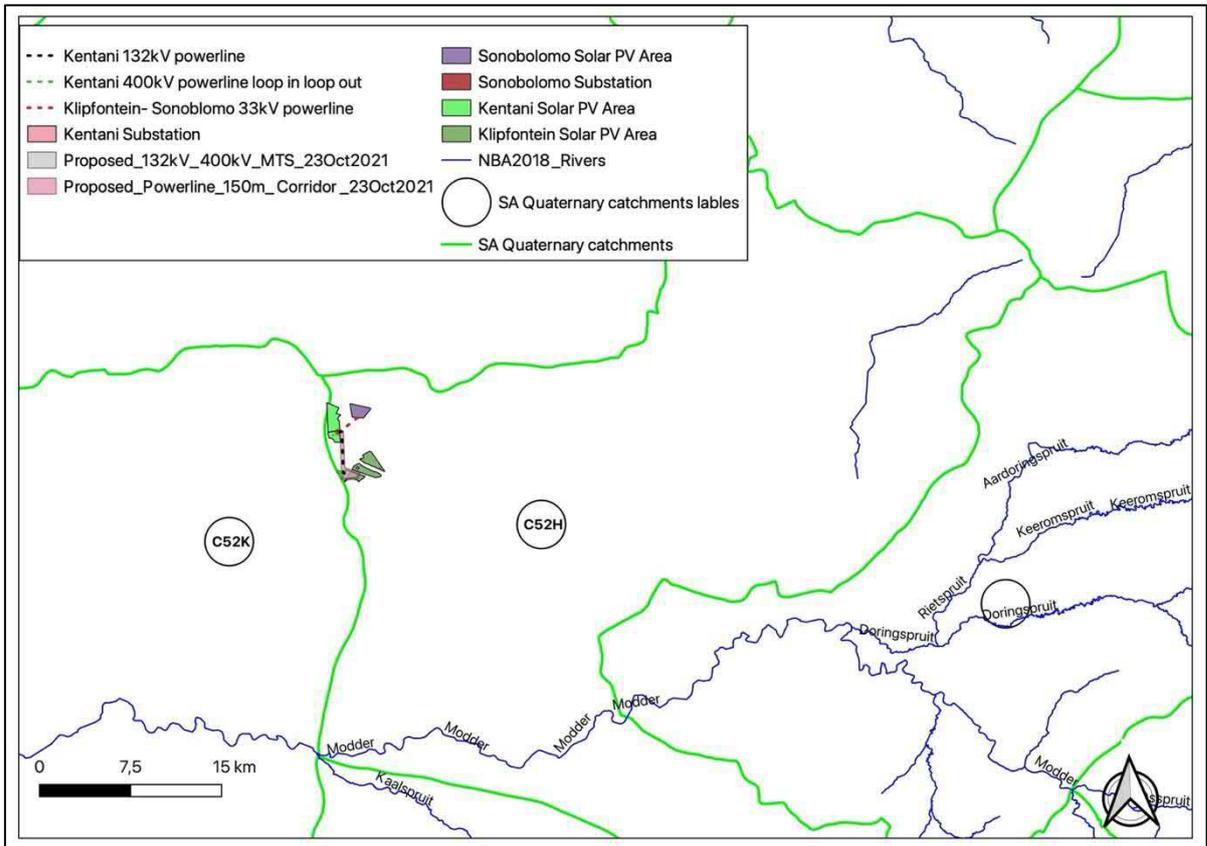


Figure 3: Project locality map indicating the various quaternary catchments and mainstem rivers (Source DWS and NGI) within the project boundary



Plate 5.1: One the larger pans located near (ca 900m) of the Kentani Substation



Plate 5.2: The minor drainage above the Klipfontein PV sites, with one of the farm dams in the background

Figure 4 indicates the available spatial data with regard potential wetlands and or riverine systems within the study area (van Deventer *et al.*, 2020). During the field work, the site was then ground-truthed as well as compared to 1: 50 000 topocadastral surveys mapping data and that which was observed on site (Figure 5). A baseline map was then refined using the 2021 survey data, when near the proposed infrastructure (Figure 6).

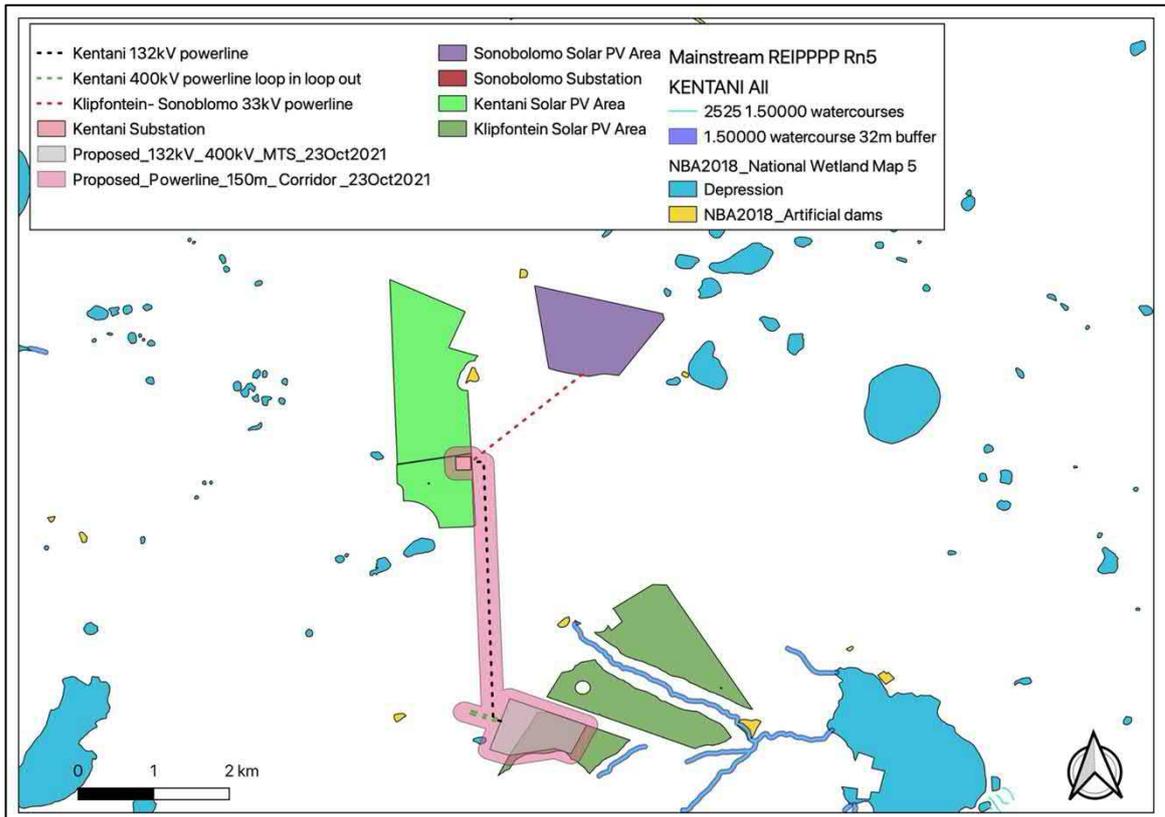


Figure 4: National Wetland Inventory wetlands and waterbodies (van Deventer et al., 2020)

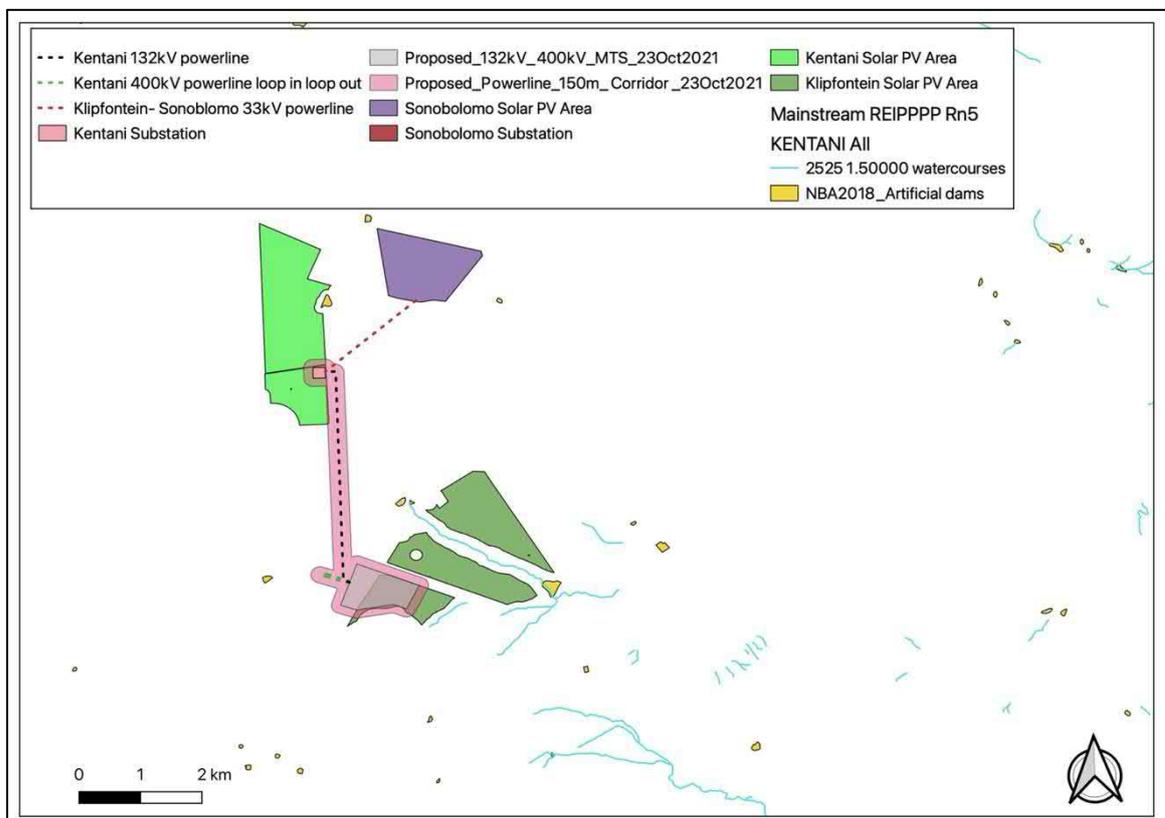


Figure 5: Watercourses indicated by the 1:50 000 topocadastral NGI data

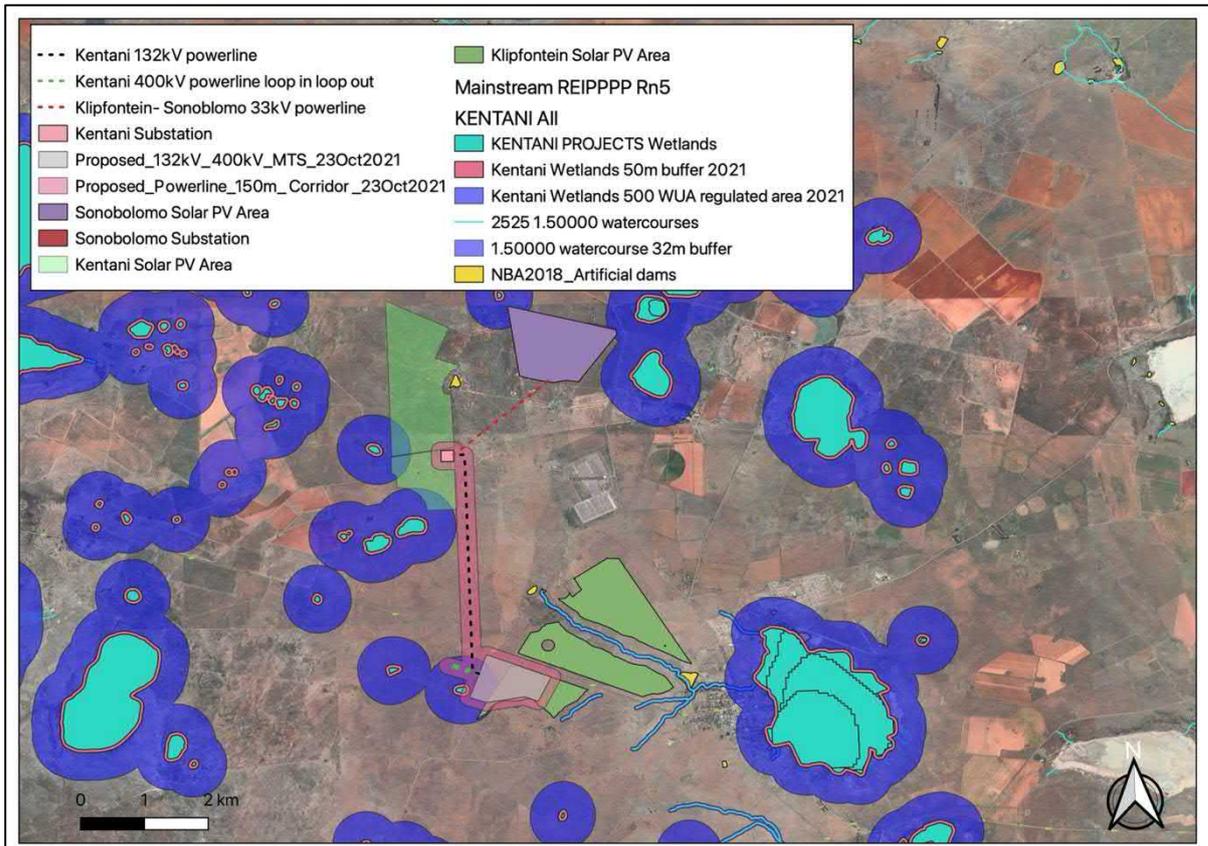


Figure 6: Confirmed and delineated waterbodies in relation to the proposed infrastructure as well as any of the regulated WUA areas

The Present Ecological State (PES) of a river, watercourse or wetland represents the extent to which it has changed from the reference or near pristine condition (Category A) towards a highly impacted system where there has been an extensive loss of natural habit and biota, as well as ecosystem functioning (Category E).

The PES scores were revised for the country and based on newer models, aspects of functional importance as well as direct and indirect impacts have been included (DWS, 2014). The new PES system incorporates Ecological Importance (EI) and Ecological Sensitivity (ES) separately as opposed to Ecological Importance and Sensitivity (EIS) in the old model, although the new model is still heavily centred on rating rivers using broad fish, invertebrate, riparian vegetation and water quality indicators. The Recommended Ecological Category (REC) is still contained within the new models, with the default REC being B, when little or no information is available to assess the system or when only one of the above-mentioned parameters are assessed or the overall PES is rated between a C or D.

All the systems assessed by DWS (2014) on a Subquaternary level within the study area were rated as PES = D or Largely Modified within the greater region (SQ3155). While these were also rated as High in terms of Ecological Sensitivity and High in terms of Ecological Importance respectively.

Based on the information collected during the field investigations, these ratings are verified and upheld for the riverine systems. Overall, these catchment areas and subsequent rivers / watercourses are in a natural state with localised impacts in some areas, which include the following:

- Erosion and sedimentation associated with existing road crossings; and
- Impeded water flow due to several in channel farm dams or weirs.

The pans and depression, range from PES = B (Largely natural) to C (Moderately Modified), link to changes to their catchments being modified by agricultural encroachment.

The DFFE screening tool indicated that several Very High aquatic sensitivity features were located within the greater region (pans), while the remainder of the areas (MTS) were rated a Medium.

The presence of these Very High Sensitivity features was confirmed during this assessment (See Appendix 2 for Verification Statement), as delineated in Figure 6.

The study area is also not located within an International Bird Area (IBA) or a Strategic Water Resource Area but is located within a listed Threatened Ecosystems.

6. SENSITIVITY MAPPING

Using the baseline description and field data while considering the current disturbances and site characteristics, the following features were identified, then categorized into one of number pre-determined sensitivity categories to provide protect and/or guide the layout planning and design processes of the corridor and a suitable alignment for the grid within. Aquatic sensitivity mapping categorizes feature or areas (with their buffers) into the following categories:

No Go	Legislated “no go” areas or setbacks and areas or features that are considered of such significance that impacting them may be regarded as fatal flaw or strongly influence the project impact significance profile
High	Areas or features that are considered to have a high sensitivity or where project infrastructure would be highly constrained and should be avoided as far as possible. Infrastructure located in these areas are likely to drive up impact significance ratings and mitigations
Medium	Buffer areas and or areas that are deemed to be of medium sensitivity
Low	Areas of low sensitivity or constraints
Neutral	Unconstrained areas (left blank in mapping)

Figure 7 indicates the No-Go areas (pans) and High (watercourses) that have been avoided by the proposed layout options.

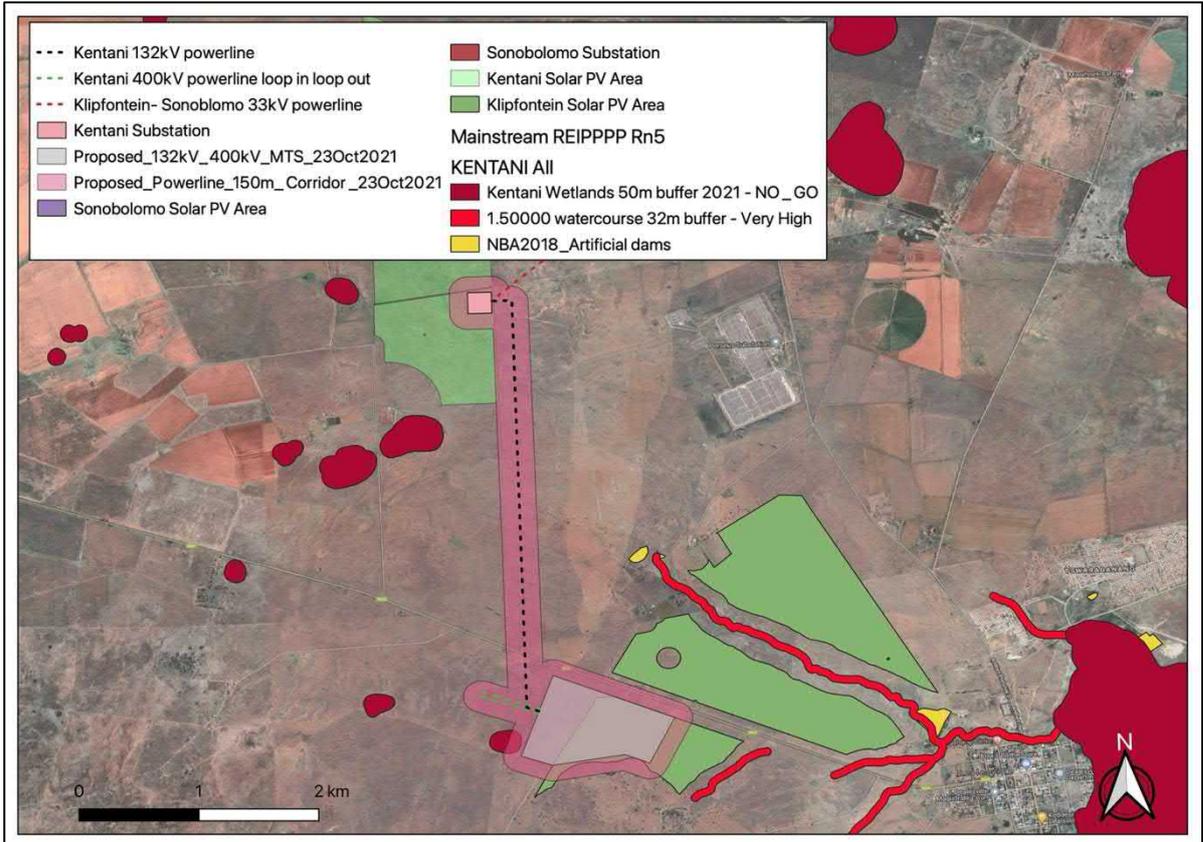


Figure 7: Results of the sensitivity analysis

7. SPECIALIST FINDINGS ASSESSMENT OF IMPACTS

The aquatic environment is typical of this portion of the Highveld ecoregion, being dominated by large numbers of small drainage lines and various pans/depressions. With regards impacts, the pans / depression are highly susceptible to changes to any hydrological regimes as well as direct disturbance within the small and localised catchments. Secondary impacts are most related to water quality (spills) and the increase in surface flows presented by hard surfaces. This if no stormwater management is provided then this results in erosion and sedimentation.

7.1 Impact assessment

The following impacts were then assessed, which are aligned with those contained in the Biodiversity Assessment Protocol and include in the table below and assessed against the proposed alignment and potential activities:

Biodiversity Assessment Protocol Impacts found applicable to this project	Impacts assessed in this report below
Faunal and vegetation communities inhabiting the site	Impact 1 and 2
Fragmentation (physical loss of ecological connectivity = Wetland cluster)	Impact 1 and 2
Changes in numbers and density of species	Impact 1 and 2
Water quality changes (increase in sediment, organic loads, chemicals or eutrophication)	Impact 3
Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)	Impact 4
Streamflow regulation	Impact 2
Erosion control	Impact 4
Cumulative Impacts	Impact 5

As highlighted above the following impacts on the aquatic environment have been identified and will be assessed in greater detail as follows, as well as separately the No-Go and Cumulative impacts:

Construction & Decommissioning Phases

- Impact 1: Loss of aquatic species of special concern
- Impact 2: Damage or loss of riparian systems and disturbance of the waterbodies in the construction phase
- Impact 3: Potential impact on localised surface water quality

Operational phase

- Impact 4: Impact on aquatic systems through the possible increase in surface water runoff on form and function - Increase in sedimentation and erosion.

Table 2: Table 3 Loss of aquatic species including any Species of Special Concern

Issue	Loss of aquatic species including any Species of Special Concern
Description of Impact	
Potential loss of protected or listed aquatic species, however none were observed on site	
Type of Impact	Direct
Nature of Impact	Negative
Phases	Construction

Issue	Loss of aquatic species including any Species of Special Concern	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Very Low
Duration	Medium-term	Short-term
Extent	Local	Site
Consequence	Medium	Very Low
Probability	Conceivable	Unlikely/ improbable
Significance	Low -	Insignificant
Degree to which impact can be reversed	If any plants are encountered these can be relocated with a limited degree of success	
Degree to which impact may cause irreplaceable loss of resources	Low	
Degree to which impact can be mitigated	High -	
Mitigation actions		
The following measures are recommended:	The current layout must be selected, to ensure all the observed aquatic systems will be avoided, thus avoiding this impact	
Monitoring		
The following monitoring is recommended:	ECO / ESO during construction inspects the area on a regular basis (weekly) for any unique plants (mostly bulbs and succulents) that may appear during the growth seasons	

Table 4: Damage or loss of riparian systems and disturbance of waterbodies in the construction / decommissioning phase

Issue	Damage or loss of riparian systems and disturbance of waterbodies in the construction / decommissioning phase	
Description of Impact		
Construction & decommissioning could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new crossing are made or large hard engineered surfaces are placed within these systems (incl the Proposed buffer). Loss can also include a functional loss, through change in vegetation type via alien encroachment for example		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Long-term	Short-term
Extent	Local	Site
Consequence	Medium	Low
Probability	Probable	Conceivable
Significance	Medium -	Very Low +
Degree to which impact can be reversed	Yes with a significant amount of rehabilitation	
Degree to which impact may cause irreplaceable loss of resources	Medium	
Degree to which impact can be mitigated	High	
Mitigation actions		

The following measures are recommended:	<ul style="list-style-type: none"> • The current layout must be selected, to ensure all the observed aquatic systems will be avoided, thus avoiding this impact • Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. • Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc). This will the avoid any secondary impacts that could affect downstream areas.
Monitoring	
The following monitoring is recommended:	All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings.

Table 5: Water quality changes (increase in sediment, organic loads, chemicals or eutrophication

Issue	Water quality changes (increase in sediment, organic loads, chemicals or eutrophication)	
Description of Impact		
<p>During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the fuel storage facility must be given.</p> <p>Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system</p>		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Long-term	Short-term
Extent	Local	Site
Consequence	Medium	Low
Probability	Probable	Conceivable
Significance	Medium -	Very Low +
Degree to which impact can be reversed	Yes with a significant amount of rehabilitation	
Degree to which impact may cause irreplaceable loss of resources	Medium	
Degree to which impact can be mitigated	High	
Mitigation actions		
The following measures are recommended:	<ul style="list-style-type: none"> • All liquid chemicals including fuels and oil, must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill 	

	<p>kits needed to contain likely worst-case scenario leak or spill in that facility, safely.</p> <ul style="list-style-type: none"> • Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. • All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses. • Littering and contamination associated with construction activity must be avoided through effective construction camp management; • No stockpiling should take place within or near a water course • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable
Monitoring	
The following monitoring is recommended:	ESO monitors the site on a daily basis to ensure plant is in working order (minimise leaks), spills are prevented and if they do occur a quickly rectified.

Table 6: Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)

Issue	Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)	
Description of Impact		
Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems, which are currently ephemeral. This then increases the rate of erosions and sedimentation of downstream areas.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Operation	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Medium
Duration	Long-term	Short-term
Extent	Site	Site
Consequence	Medium	Low
Probability	Probable	Conceivable
Significance	Medium -	Very Low +
Degree to which impact can be reversed	High with rehabilitation	
Degree to which impact may cause irreplaceable loss of resources	Medium	
Degree to which impact can be mitigated	High	
Mitigation actions		
The following measures are recommended:	<ul style="list-style-type: none"> • A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures 	

	<p>and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems.</p> <ul style="list-style-type: none"> • Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil.
Monitoring	
The following monitoring is recommended:	This stormwater control systems must be inspected on an annual basis to ensure these are functional

Table 7-7: Summary of impacts

7.2 Alternatives

No alternatives were assessed as the design process has passed through several iterations, taking cognisance of any No-Go and Very High sensitivity areas.

However, with regard the No-Go, the status quo will remain, coupled to the continued impacts associated with agricultural practices.

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 time⁴ 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^{Error! Bookmark not defined.}, 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](#)

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.

- 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 Faraday PV solar projects and associated infrastructure - [14/12/16/3/3/2/855](#)
- 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](#)

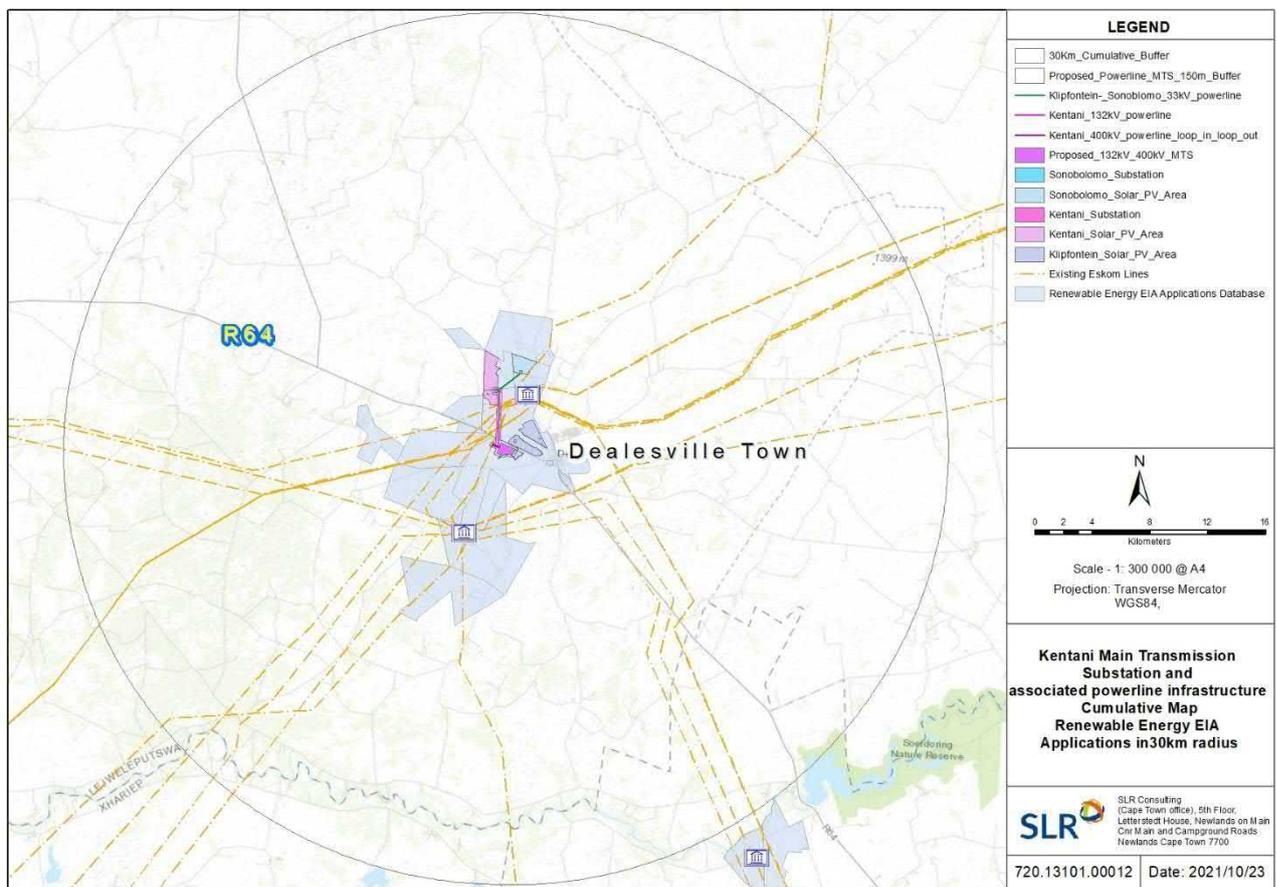


Figure 8: Cumulative map showing renewable energy projects with a 30km buffer

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 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

Table 8: Loss of aquatic species including any Species of Special Concern

Issue	Loss of aquatic species including any Species of Special Concern	
Description of Impact		
Potential loss of protected or listed aquatic species		
Cumulative impacts		
Nature of cumulative impacts	The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of most of these projects and or review of the past assessments as part of any required Water Use Licenses. The premise of all the reviewed or assessed projects has been the avoidance of impacts on the aquatic environment, which have been achieved by the various proposed layouts. The only remaining impacts will be the crossing of internal roads over minor watercourse / drainage lines for some of the longer grid connections for those projects.	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Low -	Insignificant

Table 9: Damage or loss of riparian systems and disturbance of waterbodies in the construction / decommissioning phase

Issue	Damage or loss of riparian systems and disturbance of waterbodies in the construction / decommissioning phase	
Description of Impact		
Construction & decommissioning could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new crossing are made or large hard engineered surfaces are placed within these systems (incl the Proposed buffer). Loss can also include a functional loss, through change in vegetation type via alien encroachment for example		
Cumulative impacts		
Nature of cumulative impacts	The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of most of these projects and or review of the past assessments as part of any required Water Use Licenses. The premise of all the reviewed or assessed projects has been the avoidance of impacts on the aquatic environment, which have been achieved by the various proposed layouts. The only remaining impacts will be the crossing of internal roads over minor watercourse / drainage lines for some of the longer grid connections for those projects.	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Medium -	Very Low -

Table 10: Water quality changes (increase in sediment, organic loads, chemicals or eutrophication)

Issue	Water quality changes (increase in sediment, organic loads, chemicals or eutrophication)
Description of Impact	
During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills	

during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the fuel storage facility must be given.

Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system

Cumulative impacts		
Nature of cumulative impacts	Although most of the projects are linear in fashion, while being spread over a wide area, most of the projects are located within the greater Gouritz catchment. However spills and water quality issues remain localised due to the ephemeral nature of the aquatic systems	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Medium -	Very Low -

Table 11: Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)

Issue	Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)	
Description of Impact		
Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems, which are currently ephemeral. This then increases the rate of erosions and sedimentation of downstream areas.		
Cumulative impacts		
Nature of cumulative impacts	The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of most of these projects and or review of the past assessments as part of any required Water Use Licenses. The premise of all the reviewed or assessed projects has been the avoidance of impacts on the aquatic environment, which have been achieved by the various proposed layouts. The only remaining impacts will be the crossing of internal roads over minor watercourse / drainage lines for some of the longer grid connections for those projects.	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Medium -	Low -

8. CONCLUSION AND SUMMARY

8.1 Summary of Findings

The nature of the substations and transmission lines are such that they carry low intensity impact on aquatic resources. This however this assumes that the No-Go and Very High sensitivity systems are spanned and or avoided by the proposed structures.

A variety of aquatic features, mostly ephemeral in nature were observed within the study area and these were mapped and buffered as necessary for their protection. The current layout has avoided these sensitive features and buffer areas, negating the potential overall impact and risk to Aquatic resources.

The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance. Overall, it is expected that the impact on the aquatic environment would be Very Low (-).

8.2 Conclusion and Impact Statement

Based on the findings of this study, the specialist finds no reason to withhold to an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented. A key recommendation is also that that during the later design process, that the temporary construction camps and or substations as required be located outside of the aquatic systems and the associated buffer.

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10. **Appendix 1: Specialist CV**

CURRICULUM VITAE
Dr Brian Michael Colloty
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Profession: Ecologist & Environmental Assessment Practitioner (Pr. Sci. Nat. 400268/07)
Member of the South African Wetland Society
Specialisation: Ecology and conservation importance rating of inland habitats, wetlands, rivers & estuaries
Years experience: 25 years

SKILLS BASE AND CORE COMPETENCIES

- 25 years experience in environmental sensitivity and conservation assessment of aquatic and terrestrial systems inclusive of Index of Habitat Integrity (IHI), WET Tools, Riparian Vegetation Response Assessment Index (VEGRAI) for Reserve Determinations, estuarine and wetland delineation throughout Africa. Experience also includes biodiversity and ecological assessments with regard sensitive fauna and flora, within the marine, coastal and inland environments. Countries include Mozambique, Kenya, Namibia, Central African Republic, Zambia, Eritrea, Mauritius, Madagascar, Angola, Ghana, Guinea-Bissau and Sierra Leone. Current projects also span all nine provinces in South Africa.
- 15 years experience in the coordination and management of multi-disciplinary teams, such as specialist teams for small to large scale EIAs and environmental monitoring programmes, throughout Africa and inclusive of marine, coastal and inland systems. This includes project and budget management, specialist team management, client and stakeholder engagement and project reporting.
- GIS mapping and sensitivity analysis

TERTIARY EDUCATION

- 1994: B Sc Degree (Botany & Zoology) - NMU
- 1995: B Sc Hon (Zoology) - NMU
- 1996: M Sc (Botany - Rivers) - NMU
- 2000: Ph D (Botany – Estuaries & Mangroves) – NMU

EMPLOYMENT HISTORY

- 1996 – 2000 Researcher at Nelson Mandela University – SAB institute for Coastal Research & Management. Funded by the WRC to develop estuarine importance rating methods for South African Estuaries
- 2001 – January 2003 Training development officer AVK SA (reason for leaving – sought work back in the environmental field rather than engineering sector)
- February 2003- June 2005 Project manager & Ecologist for Strategic Environmental Focus (Pretoria) – (reason for leaving – sought work related more to experience in the coastal environment)
- July 2005 – June 2009 Principal Environmental Consultant Coastal & Environmental Services (reason for leaving – company restructuring)
- June 2009 – August 2018 Owner / Ecologist of Scherman Colloty & Associates cc
- August 2018 Owner / Ecologist - EnviroSci (Pty) Ltd

SELECTED RELEVANT PROJECT EXPERIENCE

World Bank IFC Standards

- Botswana South Africa 400kv transmission line (400km) biodiversity assessment on behalf of Aurecon -

current

- Farim phosphate mine and port development, Guinea Bissau – biodiversity and estuarine assessment on behalf of Knight Piesold Canada – 2016.
- Tema LNG offshore pipeline EIA – marine and estuarine assessment for Quantum Power (2015).
- Colluli Potash South Boulder, Eritrea, SEIA marine baseline and hydrodynamic surveys co-ordinator and coastal vegetation specialist (coastal lagoon and marine) (on-going).
- Wetland, estuarine and riverine assessment for Addax Biofuels Sierra Leone, Makeni for Coastal & Environmental Services: 2009
- ESHIA Project manager and long-term marine monitoring phase coordinator with regards the dredge works required in Luanda bay, Angola. Monitoring included water quality and biological changes in the bay and at the offshore disposal outfall site, 2005-2011

South African

- Plant and animal search and rescue for the Dassies Ridge Wind Farm on behalf of EDF, Current
- Plant and animal search and rescue for the Karusa and Soetwater Wind Farms on behalf of Enel Green Power, Current
- Plant and animal search and rescue for the Nxuba, Oyster Bay and Garob Wind Farms on behalf of Enel Green Power, 2018 - 2019
- Plant and Animal Search and Rescue for the Port of Ngqura, Transnet Landside infrastructure Project & OTGC Tank Farm, with development and management of on site nursery (2019)
- Plant search and rescue, for NMBM (Driftsands sewer, Glen Hurd Drive) 2018
- Wetland specialist appointed to update the Eastern Cape Biodiversity Conservation Plan, for the Province on behalf of EOH CES appointment by SANBI – current. This includes updating the National Wetland Inventory for the province, submitting the new data to CSIR/SANBI.
- CDC IDZ Alien eradication plans for three renewable projects Coega Wind Farm, Sonop Wind Farm and Coega PV, on behalf of JG Afrika (2016 – 2017).
- Nelson Mandela Bay Municipality Baakens River Integrated Wetland Assessment (Inclusive of Rehabilitation and Monitoring Plans) for CEN IEM Unit - Current
- Rangers Biomass Gasification Project (Uitenhage), biodiversity and wetland assessment and wetland rehabilitation / monitoring plans for CEM IEM Unit – 2017
- Gibson Bay Wind Farm implementation of the wetland management plan during the construction and operation of the wind farm (includes surface / groundwater as well wetland rehabilitation & monitoring plan) on behalf of Enel Green Power - 2018
- Gibson Bay Wind Farm 133kV Transmission Line wetland management plan during the construction of the transmission line (includes wetland rehabilitation & monitoring plan) on behalf of Eskom – 2016.
- Tsitsikamma Community Wind Farm implementation of the wetland management plan during the construction of the wind farm (includes surface / biomonitoring, as well wetland rehabilitation & monitoring plan) on behalf of Cennergi – completed May 2016.
- Alicedale bulk sewer pipeline for Cacadu District, wetland and water quality assessment, 2016
- Mogalakwena 33kv transmission line in the Limpopo Province, on behalf of Aurecon, 2016
- Cape St Francis WWTW expansion wetland and passive treatment system for the Kouga Municipality, 2015
- Macindane bulk water and sewer pipelines wetland and wetland rehabilitation plan 2015
- Eskom Prieska to Copperton 132kV transmission line aquatic assessment, Northern Cape on behalf of Savannah Environmental 2015.
- Joe Slovo sewer pipeline upgrade wetland assessment for Nelson Mandela Bay Municipality 2014
- Cape Recife Waste Water Treatment Works expansion and pipeline aquatic assessment for Nelson Mandela Bay Municipality 2013
- Pola park bulk sewer line upgrade aquatic assessment for Nelson Mandela Bay Municipality 2013
- Transnet Freight Rail – Swazi Rail Link (Current) wetland and ecological assessment on behalf of Aurecon for the proposed rail upgrade from Ermelo to Richards Bay

- Eskom Transmission wetland and ecological assessment for the proposed transmission line between Pietermaritzburg and Richards Bay on behalf of Aurecon (2012).
- Port Durnford Exxaro Sands biodiversity assessment for the proposed mineral sands mine on behalf of Exxaro (2009)
- Fairbreeze Mine Exxaro (Mtunzini) wetland assessment on behalf of Strategic Environmental Services (2007).
- Wetland assessment for Richards Bay Minerals (2013) – Zulti North haul road on behalf of RBM.
- Biodiversity and aquatic assessments for renewable projects in the Western, Eastern, Northern Cape, KwaZulu-Natal and Free State provinces. Clients included RES-SA, Red Cap, ACED Renewables, Mainstream Renewable, GDF Suez, Globeleq, ENEL, Abengoa amongst others. Particular aquatic sensitivity assessment and Water Use License Applications on behalf of Mainstream Renewable Energy (8 wind farms and 3 PV facilities.), Cennergi / Exxaro (2 Wind farms), WKN Wind current (2 wind farms & 2 PV facilities), ACED (6 wind farms) and Windlab (3 Wind farms) were also conducted. Several of these projects also required the assessment of the proposed transmission lines and switching stations, which were conducted on behalf of Eskom.
- Vegetation assessments on the Great Brak rivers for Department of Water and Sanitation, 2006 and the Gouritz Water Management Area (2014)
- Proposed FibreCo fibre optic cable vegetation assessment along the PE to George, George to Graaf Reinet, PE to Colesburg, and East London to Bloemfontein on behalf of SRK (2013-2015).

11. Appendix 2: Site verification / screening report

Part A of the Assessment Protocols published in GN 320 on 20 March 2020 (i.e., Site sensitivity verification is required where a specialist assessment is required but no specific assessment protocol has been prescribed) is applicable where the DEFF Screening Tool has the relevant themes to verify.

Prior to commencing with a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration (as identified by the screening tool) must be confirmed by undertaking a site sensitivity verification.

INTRODUCTION

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing to add one (1) Main Transmission Substation (MTS) and three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines (namely the associated electrical infrastructure) 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 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)]. 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 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 (SG Code: F0040000000030500000). 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. 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).

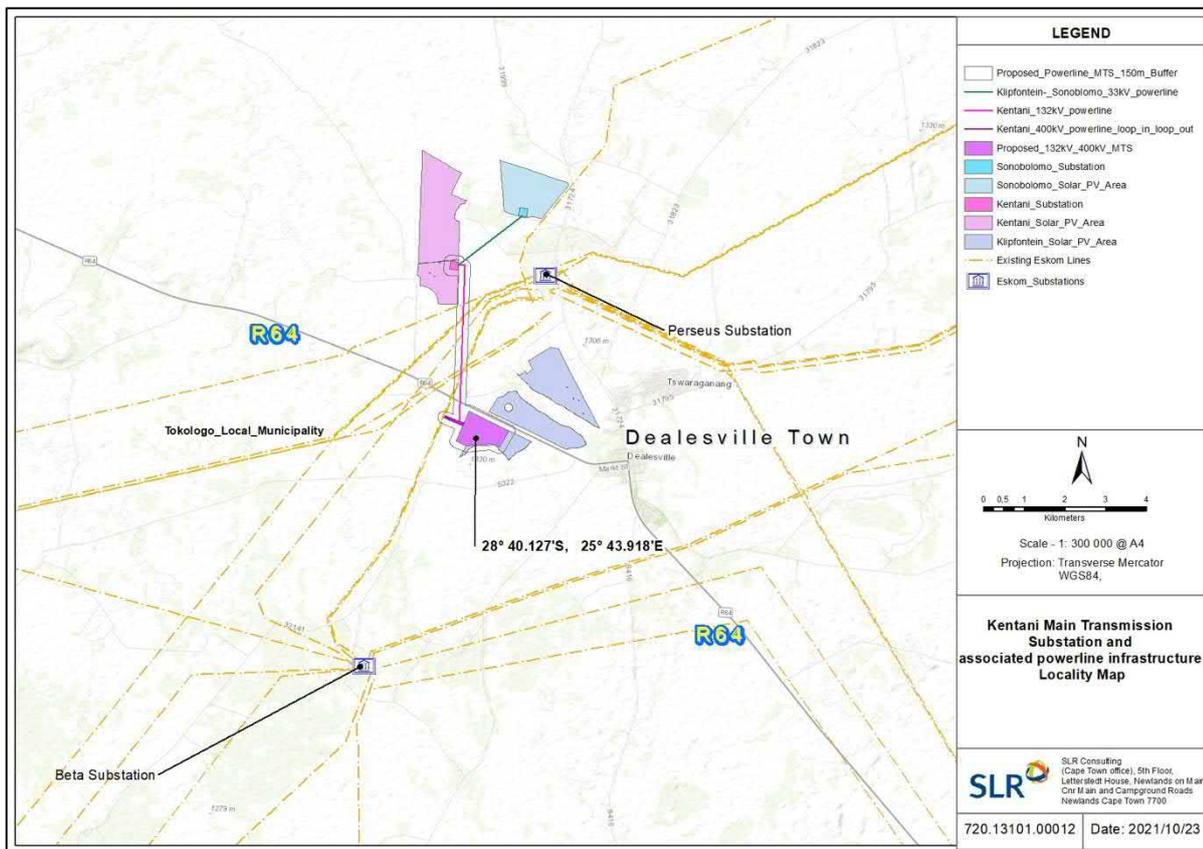


Figure 9: Locality Map of the proposed Main Transmission Substation (MTS) and associated electrical infrastructure (including grid connection corridors)

Considering the above, it is important to note that the location of the proposed MTS as well as the corridors being proposed for the powerlines 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 2016⁵.

In addition to the above, the proposed MTS and powerlines are located within 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. The proposed MTS will occupy a footprint of approximately 64ha (i.e., 800m x 800m). 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 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) are being proposed and will connect the proposed MTS to the existing Eskom 400kV powerline, located approximately 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) is being proposed and 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. One (1) 33kV powerline (approx. 2km in length) is being proposed and will connect the authorised 75MW Sonobolomo PV facility (14/12/16/3/3/2/723), which is located approximately 5km north of the proposed

⁵ 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).

MTS site, to the authorised Kentani on-site substation (14/12/16/3/3/2/724) (approx. 4km north-west of proposed MTS site).

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.

As part of the BA process, powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the 400kV and 132kV powerlines. 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

SITE SENSITIVITY VERIFICATION

In accordance with Appendix 6 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014, a site sensitivity verification has been undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

Using the result of the specialist aquatic impact assessment, that made use of past and current spatial databases, aerial images and field work conducted within and adjacent to the site over a number of years / seasons, various habitats were delineated and the rated in terms of their sensitivity.

OUTCOME OF SITE SENSITIVITY VERIFICATION

Similar to the results of the Screening Tool, the study area contained two types of sensitivity aquatic habitats, namely Very High and Medium (Figure 10). However, the extent of the Very High Sensitivity areas was found be greater in extent that what is shown in Figure 10 and these were rated as No-Go including a 50m buffer

NATIONAL ENVIRONMENTAL SCREENING TOOL COMPARISON

Based on the DFFE Screening Tool, the site contains areas of very high sensitivity due to the presence of CBAs, NFEPAs and rivers. The remaining area within the development footprint is deemed to be of low sensitivity.

Figure 1 below shows the sensitivity map produced following the desktop assessment as well as a ground-truthing exercises, with mapping of the observed features at a finer scale.

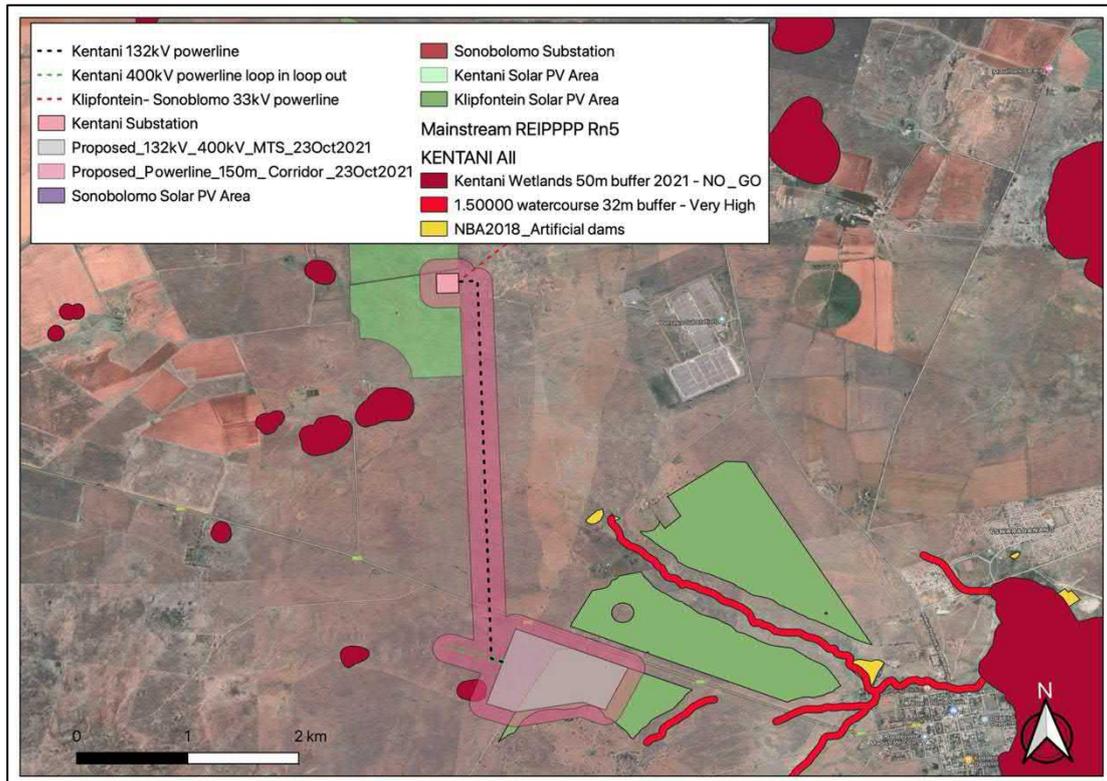


Figure 10.: Environmental sensitivity map produced by the aquatic specialist

CONCLUSION

In conclusion, the DFFE Screening Tool identified two sensitivity ratings within the development study area, very high and low. Although there is some overlap with the findings on site and the Screening Tool’s outcome, the extent of the Very High sensitivity areas was accurately delineated when compared to the Screening Tool.

However an appropriate layout has been developed to minimise the impact on the Very High areas and is presently deemed acceptable by the aquatic ecologist.

12. Appendix 3 - Methodology

This study followed the approaches of several national guidelines with regards to wetland assessment. These have been modified by the author, to provide a relevant mechanism of assessing the present state of the study area aquatic systems, applicable to the specific environment and, in a clear and objective manner, identify and assess the potential impacts associated with the proposed development site based on information collected within the relevant farm portions.

Current water resource classification systems make use of the Hydrogeomorphic (HGM) approach, and for this reason, the National Wetland Classification System (NWCS) approach will be used in this study. It is also important to understand the legal definition of a wetland, the means of assessing wetland conservation and importance and the relevant legislation aimed at protecting wetlands. These aspects will be discussed in greater depth in this section of the report, as they form the basis of the study approach to assessing wetland impacts. For reference the following definitions are as follows:

- **Drainage line:** A drainage line is a lower category or order of watercourse that does not have a clearly defined bed or bank. It carries water only during or immediately after periods of heavy rainfall i.e. non-perennial, and riparian vegetation may not be present.
- **Perennial and non-perennial:** Perennial systems contain flow or standing water for all or a large proportion of any given year, while non-perennial systems are episodic or ephemeral and thus contains flows for short periods, such as a few hours or days in the case of drainage lines.
- **Riparian:** The area of land adjacent to a stream or river that is influenced by stream-induced or related processes. Riparian areas which are saturated or flooded for prolonged periods would be considered wetlands and could be described as riparian wetlands. However, some riparian areas are not wetlands (e.g. an area where alluvium is periodically deposited by a stream during floods but which is well drained).
- **Wetland:** Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil (Water Act 36 of 1998); land where an excess of water is the dominant factor determining the nature of the soil development and the types of plants and animals living at the soil surface (Cowardin *et al.*, 1979).
- **Water course:** As per the National Water Act means -

(a) a river or spring;

(b) a natural channel in which water flows regularly or intermittently;

(c) a wetland, lake or dam into which, or from which, water flows; and

(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks

Waterbody classification systems

Since the late 1960's, wetland classification systems have undergone a series of international and national revisions. These revisions allowed for the inclusion of additional wetland types, ecological and conservation rating metrics, together with a need for a system that would allude to the functional requirements of any given wetland (Ewart-Smith *et al.*, 2006). Wetland function is a consequence of biotic and abiotic factors, and wetland classification should strive to capture these aspects. **Coupled to this was the inclusion of other criteria within the classification systems to differentiate between river, riparian and wetland systems, as well as natural versus artificial waterbodies.**

The South African National Biodiversity Institute (SANBI) in collaboration with several specialists and stakeholders developed the newly revised and now accepted National Wetland Classification Systems (NWCS) (Ollis *et al.*, 2013). This system comprises a hierarchical classification process of defining a wetland based on the principles of the hydrogeomorphic (HGM) approach at higher levels, with including structural features at the finer or lower levels of classification (Ollis *et al.*, 2013).

Wetlands develop in a response to elevated water tables, linked either to rivers, groundwater flows or seepage from aquifers (Parsons, 2004). These water levels or flows then interact with localised geology and soil forms, which then determines the form and function of the respective wetlands. Water is thus the common driving force,

in the formation of wetlands (DWAF, 2005). It is significant that the HGM approach has now been included in the wetland classifications as the HGM approach has been adopted throughout the water resources management realm with regards to the determination of the Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) and WET-Health assessments for aquatic environments. All these systems are then easily integrated using the HGM approach in line with the Eco-classification process of river and wetland reserve determinations used by the Department of Water and Sanitation (DWS). The Ecological Reserve of a wetland or river is used by DWS to assess the water resource allocations when assessing WULAs

The NWCS process is provided in more detail in the methods section of the report, but some of the terms and definitions used in this document are present below:

Definition Box

Present Ecological State is a term for the current ecological condition of the resource. This is assessed relative to the deviation from the Reference State. Reference State/Condition is the natural or pre-impacted condition of the system. The reference state is not a static condition, but refers to the natural dynamics (range and rates of change or flux) prior to development. The PES is determined per component - for rivers and wetlands this would be for the drivers: flow, water quality and geomorphology; and the biotic response indicators: fish, macroinvertebrates, riparian vegetation and diatoms. PES categories for every component would be integrated into an overall PES for the river reach or wetland being investigated. This integrated PES is called the EcoStatus of the reach or wetland.

EcoStatus is the overall PES or current state of the resource. It represents the totality of the features and characteristics of a river and its riparian areas or wetland that bear upon its ability to support an appropriate natural flora and fauna and its capacity to provide a variety of goods and services. The EcoStatus value is an integrated ecological state made up of a combination of various PES findings from component EcoStatus assessments (such as for invertebrates, fish, riparian vegetation, geomorphology, hydrology, and water quality).

Reserve: The quantity and quality of water needed to sustain basic *human needs* and *ecosystems* (e.g. estuaries, rivers, lakes, groundwater and wetlands) to ensure ecologically sustainable development and utilisation of a water resource. The *Ecological Reserve* pertains specifically to aquatic ecosystems.

Reserve requirements: The quality, quantity and reliability of water needed to satisfy the requirements of basic human needs and the Ecological Reserve (inclusive of instream requirements).

Ecological Reserve determination study: The study undertaken to determine Ecological Reserve requirements.

Licensing applications: Water users are required (by legislation) to apply for licenses prior to extracting water resources from a water catchment or any other activity that qualifies as a water use.

Ecological Water Requirements: This is the quality and quantity of water flowing through a natural stream course that is needed to sustain instream functions and ecosystem integrity at an acceptable level as determined during an EWR study. These then form part of the conditions for managing achievable water quantity and quality conditions as stipulated in the **Reserve Template**

Water allocation process (compulsory licensing): This is a process where all existing and new water users are requested to reapply for their licenses, particularly in stressed catchments where there is an over-allocation of water or an inequitable distribution of entitlements.

Ecoregions are geographic regions that have been delineated in a top-down manner on the basis of physical/abiotic factors. • NOTE: For purposes of the classification system, the 'Level I Ecoregions' for South Africa, Lesotho and Swaziland (Kleynhans *et al.* 2005), which have been specifically developed by the Department of Water Affairs & Forestry (DWAF) for rivers but are used for the management of inland aquatic ecosystems more generally, are applied at Level 2A of the classification system. These Ecoregions are based on physiography, climate, geology, soils and potential natural vegetation.

Wetland definition

Although the National Wetland Classification System (NWCS) (Ollis *et al.*, 2013) is used to classify wetland types it is still necessary to understand the definition of a wetland. Terminology currently strives to characterise a wetland not only on its structure (visible form), but also to relate this to the function and value of any given wetland.

The Ramsar Convention definition of a wetland is widely accepted as “areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres” (Davis 1994). South Africa is a signatory to the Ramsar Convention and therefore its extremely broad definition of wetlands has been adopted for the proposed NWCS, with a few modifications.

Whereas the Ramsar Convention included marine water to a depth of six metres, the definition used for the NWCS extends to a depth of ten metres at low tide, as this is recognised as the seaward boundary of the shallow photic zone (Lombard et al., 2005). An additional minor adaptation of the definition is the removal of the term ‘fen’ as fens are considered a type of peatland. The adapted definition for the NWCS is, therefore, as follows (Ollis *et al.*, 2013):

WETLAND: an area of marsh, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed ten metres.

This definition encompasses all ecosystems characterised by the permanent or periodic presence of water other than marine waters deeper than ten metres. The only legislated definition of wetlands in South Africa, however, is contained within the National Water Act (Act No. 36 of 1998) (NWA), where wetlands are defined as “land which is transitional between terrestrial and aquatic systems, where the water table is usually at, or near the surface, or the land is periodically covered with shallow water and which land in normal circumstances supports, or would support, vegetation adapted to life in saturated soil.” This definition is consistent with more precise working definitions of wetlands and therefore includes only a subset of ecosystems encapsulated in the Ramsar definition. It should be noted that the NWA definition is not concerned with marine systems and clearly distinguishes wetlands from estuaries, classifying the latter as a watercourse (Ollis *et al.*, 2013). Table 1 below provides a comparison of the various wetlands included within the main sources of wetland definitions used in South Africa.

Although a subset of Ramsar-defined wetlands was used as a starting point for the compilation of the first version of the National Wetland Inventory (i.e. “wetlands”, as defined by the NWA, together with open waterbodies), it is understood that subsequent versions of the Inventory include the full suite of Ramsar-defined wetlands in order to ensure that South Africa meets its wetland inventory obligations as a signatory to the Convention (Ollis *et al.*, 2013).

Wetlands must therefore have one or more of the following attributes to meet the above definition (DWAF, 2005):

- A high-water table that results in the saturation at or near the surface, leading to anaerobic conditions developing in the top 50 cm of the soil.
- Wetland or hydromorphic soils that display characteristics resulting from prolonged saturation, i.e. mottling or grey soils
- The presence of, at least occasionally, hydrophilic plants, i.e. hydrophytes (water loving plants).

It should be noted that riparian systems that are not permanently or periodically inundated are not considered true wetlands, i.e. those associated with the drainage lines and rivers.

Table 2: Comparison of ecosystems considered to be ‘wetlands’ as defined by the proposed NWCS, the NWA and ecosystems included in DWAF’s (2005) delineation manual.

Ecosystem	NWCS “wetland”	National Water Act wetland	DWAF (2005) delineation manual
Marine	YES	NO	NO
Estuarine	YES	NO	NO
Waterbodies deeper than 2 m (i.e. limnetic habitats often described as lakes or dams)	YES	NO	NO
Rivers, channels and canals	YES	NO ¹	NO
Inland aquatic ecosystems that are not river channels and are less than 2 m deep	YES	YES	YES
Riparian ² areas that are permanently / periodically inundated or saturated with water within 50 cm of the surface	YES	YES	YES ³
Riparian ³ areas that are not permanently / periodically inundated or saturated with water within 50 cm of the surface	NO	NO	YES ³

¹ Although river channels and canals would generally not be regarded as wetlands in terms of the National Water Act, they are included as a ‘watercourse’ in terms of the Act

² According to the National Water Act and Ramsar, riparian areas are those areas that are saturated or flooded for prolonged periods and would be considered riparian wetlands, as opposed to non –wetland riparian areas that are only periodically inundated and the riparian vegetation persists due to having deep root systems drawing on water many meters below the surface.

³ The delineation of ‘riparian areas’ (including both wetland and non-wetland components) is treated separately to the delineation of wetlands in DWAF’s (2005) delineation manual.

National Wetland Classification System method

Due to the nature of the wetlands and watercourses observed, it was determined that the newly accepted NWCS should be adopted. This classification approach has integrated aspects of the HGM approach used in the WET-Health system as well as the widely accepted eco-classification approach used for rivers.

The NWCS (Ollis *et al.*, 2013) as stated previously, uses hydrological and geomorphological traits to distinguish the primary wetland units, i.e. direct factors that influence wetland function. Other wetland assessment techniques, such as the DWAF (2005) delineation method, only infer wetland function based on abiotic and biotic descriptors (size, soils & vegetation) stemming from the Cowardin approach (Ollis *et al.*, 2013).

The classification system used in this study is thus based on Ollis *et al.* (2013) and is summarised below:

The NWCS has a six-tiered hierarchical structure, with four spatially nested primary levels of classification (Figure 2). The hierarchical system firstly distinguishes between Marine, Estuarine and Inland ecosystems (**Level 1**), based on the degree of connectivity the particular system has with the open ocean (greater than 10 m in depth). Level 2 then categorises the regional wetland setting using a combination of biophysical attributes at the landscape level, which operate at a broad bioregional scale.

This is opposed to specific attributes such as soils and vegetation. **Level 2** has adopted the following systems:

- Inshore bioregions (marine)
- Biogeographic zones (estuaries)

- Ecoregions (Inland)

Level 3 of the NWCS assess the topographical position of inland wetlands as this factor broadly defines certain hydrological characteristics of the inland systems. Four landscape units based on topographical position are used in distinguishing between Inland systems at this level. No subsystems are recognised for Marine systems, but estuaries are grouped according to their periodicity of connection with the marine environment, as this would affect the biotic characteristics of the estuary.

Level 4 classifies the hydrogeomorphic (HGM) units discussed earlier. The HGM units are defined as follows:

- Landform – shape and localised setting of wetland
- Hydrological characteristics – nature of water movement into, through and out of the wetland
- Hydrodynamics – the direction and strength of flow through the wetland

These factors characterise the geomorphological processes within the wetland, such as erosion and deposition, as well as the biogeochemical processes.

Level 5 of the assessment pertains to the classification of the tidal regime within the marine and estuarine environments, while the hydrological and inundation depth classes are determined for inland wetlands. Classes are based on frequency and depth of inundation, which are used to determine the functional unit of the wetlands and are considered secondary discriminators within the NWCS.

Level 6 uses six descriptors to characterise the wetland types based on biophysical features. As with Level 5, these are non-hierarchical in relation to each other and are applied in any order, dependent on the availability of information. The descriptors include:

- Geology;
- Natural vs. Artificial;
- Vegetation cover type;
- Substratum;
- Salinity; and
- Acidity or Alkalinity

It should be noted that where sub-categories exist within the above descriptors, hierarchical systems are employed, and these are thus nested in relation to each other.

The HGM unit (Level 4) is the focal point of the NWCS, with the upper levels (Figure 3 Figure – Inland systems only) providing means to classify the broad bio-geographical context for grouping functional wetland units at the HGM level, while the lower levels provide more descriptive detail on the particular wetland type characteristics of a particular HGM unit. Therefore Level 1 – 5 deals with functional aspects, while Level 6 classifies wetlands on structural aspects.

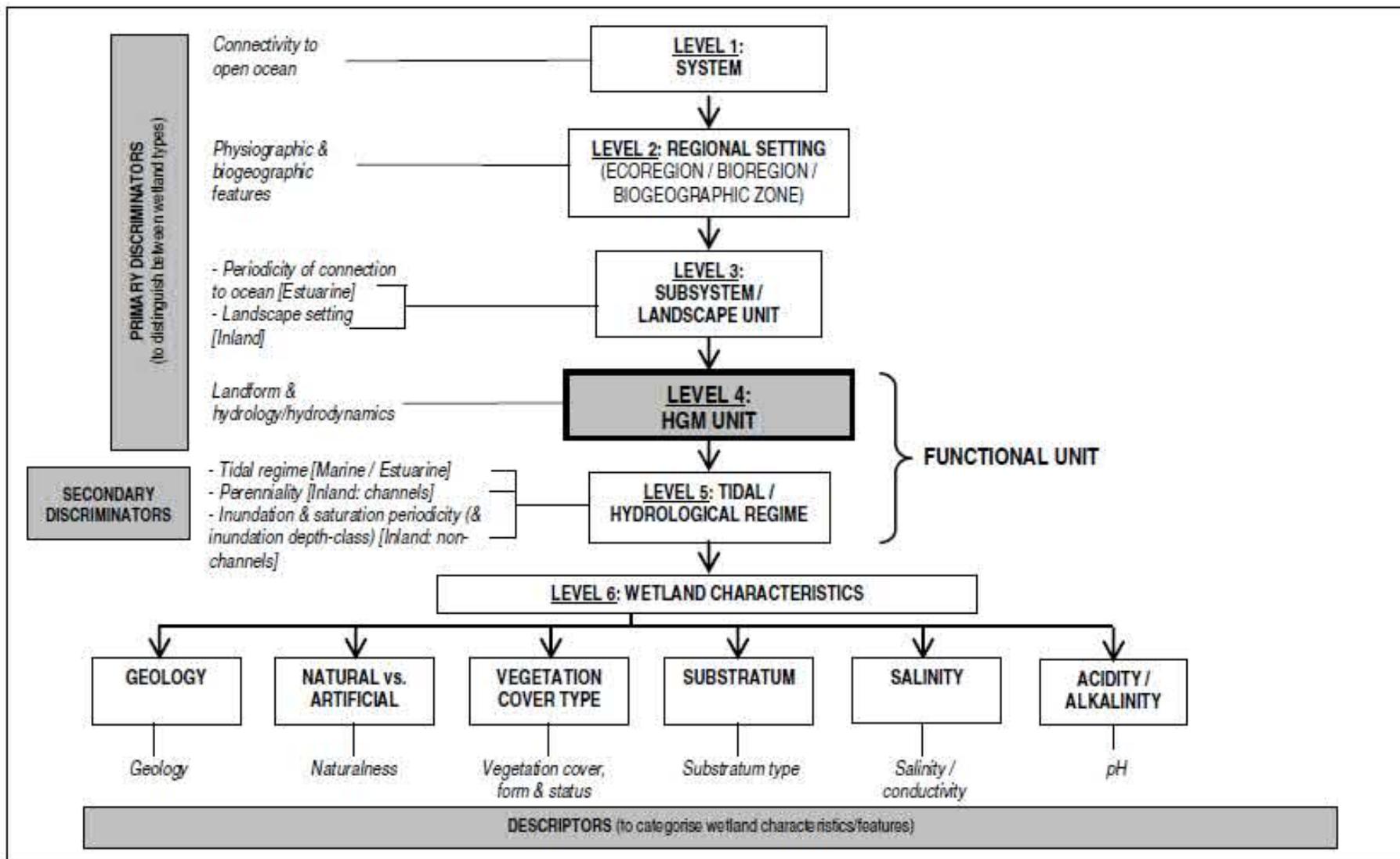


Figure 2: Basic structure of the NWCS, showing how 'primary discriminators' are applied up to Level 4 to classify Hydrogeomorphic (HGM) Units, with 'secondary discriminators' applied at Level 5 to classify the tidal/hydrological regime, and 'descriptors' applied

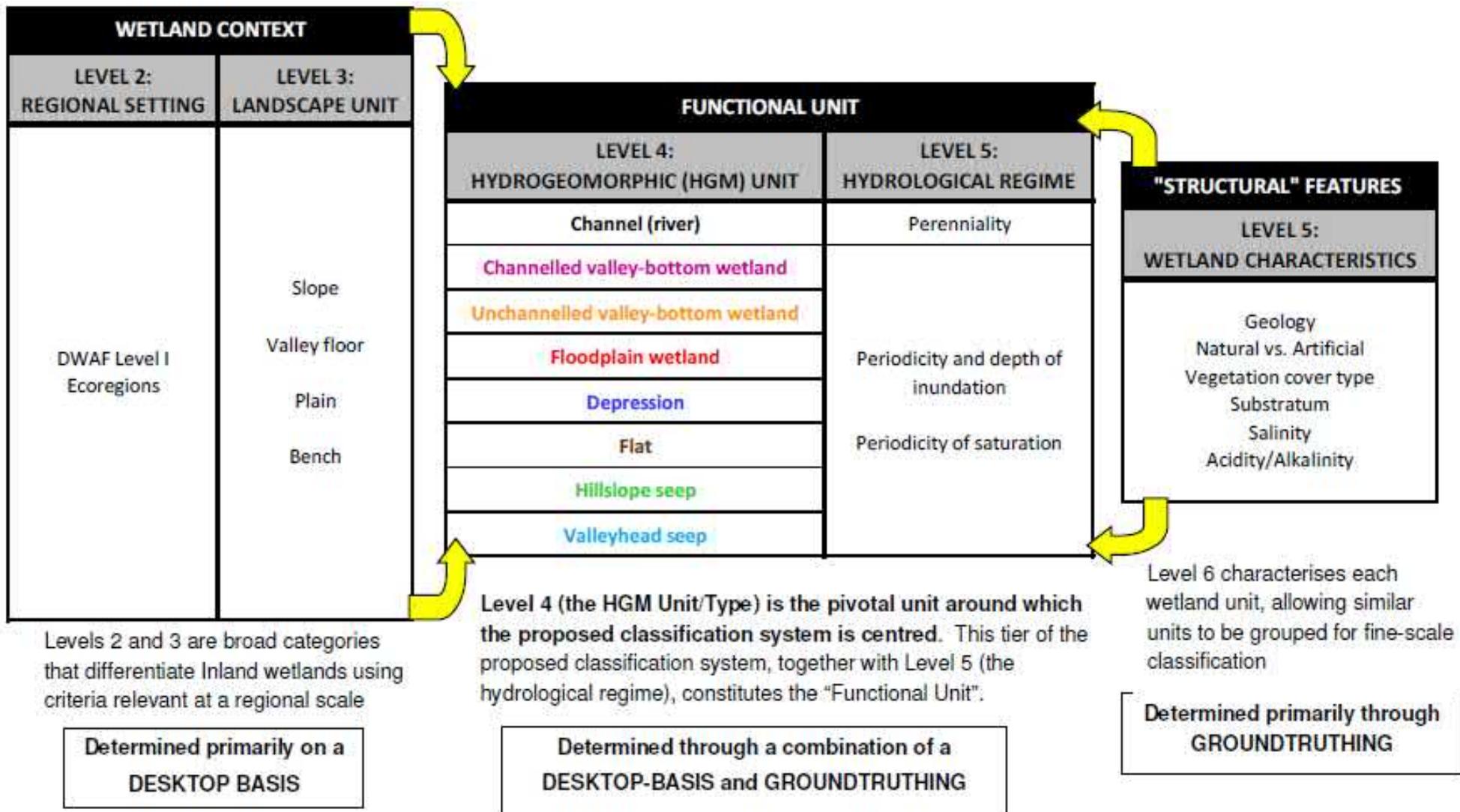


Figure 3: Illustration of the conceptual relationship of HGM Units (at Level 4) with higher and lower levels (relative sizes of the boxes show the increasing spatial resolution and level of detail from the higher to the lower levels) for Inland Systems (from Ollis *et al.*, 2013)

Waterbody condition

To assess the PES or condition of the observed wetlands, a modified Wetland Index of Habitat Integrity (DWAF, 2007) was used. The Wetland Index of Habitat Integrity (WETLAND-IHI) is a tool developed for use in the National Aquatic Ecosystem Health Monitoring Programme (NAEHMP), formerly known as the River Health Programme (RHP). The output scores from the WETLAND-IHI model are presented in the standard DWAF A-F ecological categories (Table) and provide a score of the PES of the habitat integrity of the wetland system being examined. The author has included additional criteria into the model-based system to include additional wetland types. This system is preferred when compared to systems such as WET-Health – wetland management series (WRC 2009), as WET-Health (Level 1) was developed with wetland rehabilitation in mind and is not always suitable for impact assessments. This coupled with the degraded state of the wetlands in the study area, indicated that a complex study approach was not warranted, i.e. conduct a Wet-Health Level 2 and WET-Ecosystems Services study required for an impact assessment.

Table 3: Description of A – F ecological categories based on Kleynhans *et al.*, (2005)

ECOLOGICAL CATEGORY	ECOLOGICAL DESCRIPTION	MANAGEMENT PERSPECTIVE
A	Unmodified, natural.	Protected systems; relatively untouched by human hands; no discharges or impoundments allowed
B	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.	Some human-related disturbance, but mostly of low impact potential
C	Moderately modified. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.	Multiple disturbances associated with need for socio-economic development, e.g. impoundment, habitat modification and water quality degradation
D	Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred.	
E	Seriously modified. The loss of natural habitat, biota and basic ecosystem functions is extensive.	Often characterized by high human densities or extensive resource exploitation. Management intervention is needed to improve health, e.g. to restore flow patterns, river habitats or water quality
F	Critically / Extremely modified. Modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible.	

The WETLAND-IHI model is composed of four modules. The “Hydrology”, “Geomorphology” and “Water Quality” modules all assess the contemporary driving processes behind wetland formation and maintenance. The last module, “Vegetation Alteration”, provides an indication of the intensity of human land use activities on the wetland surface itself and how these may have modified the condition of the wetland. The integration of the scores from these 4 modules provides an overall PES score for the wetland system being examined. The WETLAND-IHI model is an MS Excel-based model, and the data required for the assessment are generated during a site visit.

Additional data may be obtained from remotely sensed imagery (aerial photos; maps and/or satellite imagery) to assist with the assessment. The interface of the WETLAND-IHI has been developed in a format which is similar to DWA's River EcoStatus models which are currently used for the assessment of PES in riverine environments.

Aquatic ecosystem importance and function

South Africa is a Contracting Party to the Ramsar Convention on Wetlands, signed in Ramsar, Iran, in 1971, and has thus committed itself to this intergovernmental treaty, which provides the framework for the national protection of wetlands and the resources they could provide. Wetland conservation is now driven by the South African National Biodiversity Institute, a requirement under the National Environmental Management: Biodiversity Act (No 10 of 2004).

Wetlands are among the most valuable and productive ecosystems on earth, providing important opportunities for sustainable development (Davies and Day, 1998). However, wetlands in South Africa are still rapidly being lost or degraded through direct human induced pressures (Nel *et al.*, 2004).

The most common attributes or goods and services provided by wetlands include:

- Improve water quality;
- Impede flow and reduce the occurrence of floods;
- Reeds and sedges used in construction and traditional crafts;
- Bulbs and tubers, a source of food and natural medicine;
- Store water and maintain base flow of rivers;
- Trap sediments; and
- Reduce the number of water-borne diseases.

In terms of this study, the wetlands provide ecological (environmental) value to the area acting as refugia for various wetland associated plants, butterflies and birds.

In the past wetland conservation has focused on biodiversity as a means of substantiating the protection of wetland habitat. However not all wetlands provide such motivation for their protection, thus wetland managers and conservationists began assessing the importance of wetland function within an ecosystem.

Table below summarises the importance of wetland function when related to ecosystem services or ecoservices (Kotze *et al.*, 2008). One such example is emergent reed bed wetlands that function as transformers converting inorganic nutrients into organic compounds (Mitsch and Gosselink, 2000).

Table 4: Summary of direct and indirect ecoservices provided by wetlands from Kotze *et al.*, 2008

Ecosystem services supplied by wetlands	Indirect benefits	Hydro-geochemical benefits	Flood attenuation	
			Stream flow regulation	
			Water quality enhancement benefits	Sediment trapping
				Phosphate assimilation
				Nitrate assimilation
				Toxicant assimilation
				Erosion control
	Carbon storage			
	Biodiversity maintenance			
	Direct benefits	<i>Provision of water for human use</i>		
		<i>Provision of harvestable resources²</i>		
		<i>Provision of cultivated foods</i>		
		<i>Cultural significance</i>		
		<i>Tourism and recreation</i>		
<i>Education and research</i>				

Conservation importance of the individual wetlands was based on the following criteria:

- Habitat uniqueness;
- Species of conservation concern;
- Habitat fragmentation or rather, continuity or intactness with regards to ecological corridors; and
- Ecosystem service (social and ecological).

The presence of any or a combination of the above criteria would result in a HIGH conservation rating if the wetland was found in a near natural state (high PES). Should any of the habitats be found modified the conservation importance would rate as MEDIUM, unless a Species of Conservation Concern (SCC) was observed, in which case it would receive a HIGH rating. Any system that was highly modified (low PES) or had none of the above criteria, received a LOW conservation importance rating. Wetlands with HIGH and MEDIUM ratings should thus be excluded from development with incorporation into a suitable open space system, with the maximum possible buffer being applied. Natural wetlands or Wetlands that resemble some form of the past landscape but receive a LOW conservation importance rating could be included into stormwater management features and should not be developed to retain the function of any ecological corridors.

Avifauna

Kentani Substation & associated power lines

Avifaunal Impact Assessment

November 2021



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Submitted to:

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Executive summary

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing to add one (1) Main Transmission Substation (MTS) and four (4) power lines, with varying capacities (namely the associated electrical infrastructure), to their authorised Kentani Cluster of solar developments near the town of Dealesville in the Free State Province (the 'proposed development') (see Figure 1). The Kentani Cluster of solar developments consists of eleven (11) solar photovoltaic (PV) projects and associated electrical infrastructure (including a power line), 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)].

Up to approximately 273 bird species occur in the broader area within which the proposed project is located. Included amongst these 273 species are a number of regionally and globally Red Listed bird species and a number of endemics. These include most importantly: 1 Critically Endangered species, White-backed Vulture; and 4 Endangered species – Black Harrier, Ludwig's Bustard, Yellow-billed Stork, Martial Eagle and Tawny Eagle; 6 Vulnerable species; and 10 Near-threatened species.

Based on the formal criteria supplied by SLR, we have rated the potential impacts on avifauna as follows:

Phase	Impact	Pre-mitigation	Post mitigation
Construction	Habitat destruction	Low	Low
	Disturbance of birds	Low	Low
Operations	Collision of birds with overhead cables	Medium	Low
	Electrocution of birds perching on pylons	Low	Low
Cumulative impacts	Cumulative impacts of the project on birds	Medium	Low

These impacts will require the following mitigation measures to be implemented:

- A pre-construction avifaunal walk down should be conducted to:
 - Confirm final layout and identify any sensitivities that may arise between the conclusion of the BA process and the construction phase.
 - Identify any sensitive species breeding on site that may arise between the conclusion of the BA process and the construction phase.
- All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment.

- All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction.
- A pre-construction avifaunal walk down should be conducted to provide final confirmation of the sections of power line requiring bird collision mitigation.
- The overhead cables on high risk sections of the alignments (should be fitted with an approved anti bird collision line marking device to make cables more visible to birds in flight and reduce the likelihood of collisions. This should be done according to the Eskom Distribution and Transmission standards in terms of device spacing and other factors. Literature around the world points towards a 50-60% reduction in bird collision risk if the line is marked (Jenkins, Smallie & Diamond, 2010; Shaw *et al*, 2021). The line marking device should be a dynamic (moving – bird flapper type) device. The new power line should be patrolled by Mainstream annually to measure any impacts on birds (through detecting collision fatalities) and to monitor the durability of the line marking devices. Where multiple devices on a span have failed, they should be replaced immediately. Data should be submitted to the Eskom – Endangered Wildlife Trust Strategic Partnership where it will be curated and publicly accessible.
- It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching substrate well above dangerous hardware.
- It is also essential that if any of the pylon structures are changed, we are given opportunity to assess the electrocution risk of the new structure and design mitigation measures.

If these mitigation measures are implemented correctly we believe that the impacts of the proposed project will be at an acceptable level and we recommend the proposed project be authorised to proceed.

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 5
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 5
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 2.2
(cA) an indication of the quality and age of base data used for the specialist report;	Section 4
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 6
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 2.3
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;	Section 5
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
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 6
k) any mitigation measures for inclusion in the EMPr;	Section 8
l) any conditions for inclusion in the environmental authorisation;	Section 9
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 8 & 9
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	Section 9

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;	Section 2.4
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.	n/a



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

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DECLARATION BY THE SPECIALIST

I, _____ J. SMALLIE _____, 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

WILDSKIES ECOLOGICAL SERVICES PTY LTD

Name of Company:

8 November 2021

Date:

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1. Introduction

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing to add 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 (BESS) to their authorised Kentani Cluster of solar photovoltaic (PV) developments near the town of Dealesville in the Free State Province (the 'proposed development') (see Figure 1). 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, BESS and associated power lines, which form part of this new application and Basic Assessment (BA) process, will service all eleven (11) of Mainstream's authorised solar PV projects and associated electrical infrastructure. The proposed development area falls within the Tokologo Local Municipality, within the Lejweleputswa District Municipality.

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

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).

line development to leverage off regulatory approvals, supply chain and project development capacity

It should also 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), which is proposed on Remaining Extent of the Farm Klipfontein No. 305 (SG Code: F0040000000030500000). It should also be noted that the proposed MTS and power lines are located within one (1) of the Central Strategic Transmission Corridors (namely the Central 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. It is important to note that since the proposed MTS will be located within the authorised Klipfontein PV facility (14/12/16/3/3/2/722), the location of the proposed MTS has previously been assessed as part of the development footprint for the Klipfontein PV project, which received EA in 2016.

In terms of the EIA Regulations, 2014 (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 Department of Forestry, Fisheries and the Environment (DFFE), prior to the commencement thereof. One (1) application for EA for the proposed development will be submitted to the DFFE, in the form of a BA process, in terms of the EIA Regulations, 2014 (as amended).

Mainstream has appointed SLR Consulting Africa (South Africa) Pty Ltd (“SLR”) to conduct the necessary Basic Assessment (BA) Process. The project has potential to impact on avifauna and so WildSkies Ecological Services Pty Ltd (“WildSkies”) was appointed by SLR to conduct an avifaunal impact assessment.

It should also be noted that the proposed MTS is located within one of the Central Strategic Transmission Corridors (namely the Central Corridor) as defined and in terms of the Government Notice No 113 and No 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively.

Figure 1 shows the layout of the proposed activities.

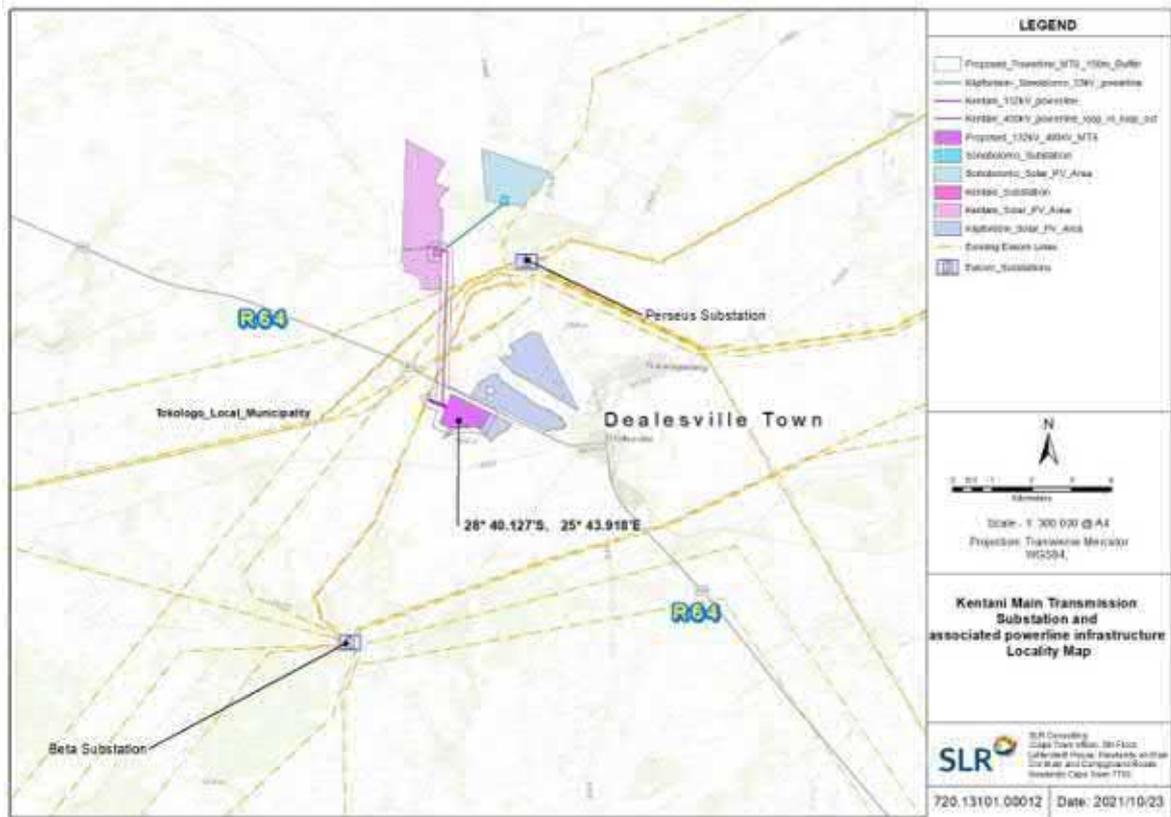


Figure 1. The locality map (SLR).

2. Methods

2.1. Project description

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) will 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 foot print

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 not trigger the need for an Application for Environmental Authorisation, however, the powerline has been considered by the specialist team.

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.

As part of the BA process, powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the 400kV and 132kV powerlines. 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.

The typical pylon structures for the proposed power lines are shown below. These typical structures in Figure 2 will be used for all the proposed 400kV power lines and the structures in Figure 3 will also be used for all the proposed 132kV powerlines, including the 33kV line. Typical 400kV pylon tower designs include the Gayed V type, Cross-Rope suspension type and self-supporting type, the design depending on whether the pylons will be placed within a straight section within the grid connection corridor, or at bends (Figure 2).



Figure 2. Typical 400kV Guyed V type (left) and Cross-Rope suspension (middle) and self-supporting (right) design

Typical 132kV pylon designs are monopole-type or lattice-type pylons the design depending on whether the pylons will be placed within a straight section within the grid connection corridor, or at bends.



Figure 3. Typical 132kV monopole type (left) or lattice-type pylons (right) design

Minimum phase-phase and phase-earth clearances for the above structures will be 2.4m to 3.8m for 132kV and 4m for 400kV.

A road in the servitude under the proposed power lines as well as an access road (approx. 4-8m wide) to the R64 provincial route will also be required. It should be noted that power line corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the proposed 400kV and 132kV power lines as part of the BA process. This is to allow flexibility when routing the power lines within the authorised corridor (should the EA be granted). No corridor is however being considered for the proposed 33kV power line.

2.2. Scope of work

The appointed specialist is required to conduct an Avifauna (bird) Impact Assessment on the proposed MTS location, BESS, two grid corridors and one 33kV distribution line. Furthermore as mentioned the location of the MTS and associated infrastructure is located within the authorised Klipfontein PV facility, which has been assessed previously by WildSkies.

The scope of work includes the following:

- » Review the DFFE online screening tool to assess the site sensitivity;
- » Prepare a Site Sensitivity Verification and Impact Assessment Report in line with the Gazetted specialist protocols;
- » Undertake a desktop study for initial data collection;
- » Conduct a field survey for ground truthing and additional data collection; and
- » Compile a report (including updates thereon) at BA level to comply with the latest regulations regarding specialist studies (i.e. site verification report and impact assessment report).

2.3. General approach

In predicting the interactions between the proposed development and birds, a combination of science, field experience and common sense is required. More specifically the methodology used to predict impacts in the current study was as follows:

- » The various avifaunal data sets listed below and the micro habitats within the study area were examined to determine the likelihood of these relevant species occurring on or near the site, and the importance of the study area for these species.
- » The substation site and power line routes were surveyed by driving and walking as much as possible of the route. During this field work the following was conducted:

- Identification of micro habitats/land use on site
 - Representative photographs were taken of available micro habitats (e.g. dams, wetlands, crops, etc.);
 - Identification of any sensitive receptors e.g. wetlands, roosts, raptor nests etc.; and
 - Identification of any constraints to power line routing. For example wetlands and dams that could be avoided with slight route amendment.
- » Field survey work was done in October 2021. This qualifies as spring, which is a good time to sample this type of avifaunal community. The timing of the field survey is therefore acceptable.
- » A list of priority bird species was determined for this assessment.
- » The potential impacts of the proposed project on these above species and habitats were described and evaluated.
- » Recommendations were made for the management and mitigation of impacts.

In simple terms, this study assesses which bird species could occur on site, how important they are, how important the site is for them, how the project will affect them, and how to mitigate these effects.

2.4. Information sources

The study made use of the following data sources:

- » Bird distribution data of the Southern African Bird Atlas Project (SABAP1 – Harrison, Allan, Underhill, Herremans, Tree, Parker & Brown, 1997 & SABAP2 - <http://sabap2.adu.org.za>) was consulted in order to ascertain which species occur in the study area. The useful source www.mybirdpatch.org.za combines these two data sources.
- » The regional conservation status of all bird species occurring in the aforementioned degree squares was then determined with the use of The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland (Taylor *et al*, 2015). The global conservation status was obtained from the IUCN Red List (2021).
- » The Important Bird and Biodiversity Areas of South Africa data (Marnewick *et al*. 2015) was consulted. This is described in Section 3.2.
- » The Co-ordinated Avifaunal Roadcount (CAR) data from South Africa (www.car.birdmap.africa) was consulted to determine its relevance. The closest route is approximately 3km from the proposed site and is discussed more in Section 3.2.
- » The Co-ordinated Waterbird Count (CWAC) data was consulted (www.cwac.birdmap.africa) to determine whether any data is available for the site. This is described more in Section 3.2.

- » Information on the micro-habitat level was obtained through visiting the area and obtaining a first-hand perspective.
- » Satellite Imagery of the area was studied using Google Earth ©2021.
- » Previous studies on the solar photovoltaic site by WildSkies (2015).

2.5. Assumptions & limitations

This study made the assumption that the above sources of information are reliable. The following factors may potentially detract from the accuracy of the predicted results:

This report is the result of a short term study, no long term studies were conducted on site. This study therefore depends heavily upon secondary or existing data sources such as those listed above. This study assumes a reasonable degree of accuracy of these data.

Predictions in this study are based on experience of these and similar species in different parts of southern Africa, through the authors' experience working in the field of wildlife – energy interaction since 2000. However bird behaviour can't be reduced to formulas that will hold true under all circumstances.

2.6. Legislation and relevant guidelines

The legislation and guidelines relevant to this specialist field and development include the following:

The Convention on Biological Diversity (CBD): dedicated to promoting sustainable development. The Convention recognizes that biological diversity is about more than plants, animals and micro-organisms and their ecosystems – it is about people and our need for food security, medicines, fresh air and water, shelter, and a clean and healthy environment in which to live. It is an international convention signed by 150 leaders at the Rio 1992 Earth Summit. South Africa is a signatory to this convention and should therefore abide by its' principles.

An important principle encompassed by the CBD is the precautionary principle which essentially states that where serious threats to the environment exist, lack of full scientific certainty should not be used a reason for delaying management of these risks. The burden of proof that the impact will not occur lies with the proponent of the activity posing the threat.

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention): aims to conserve terrestrial, aquatic and avian migratory species throughout

their range. It is an intergovernmental treaty, concluded under the aegis of the United Nations Environment Programme, concerned with the conservation of wildlife and habitats on a global scale. Since the Convention's entry into force, its membership has grown steadily to include 117 (as of 1 June 2012) Parties from Africa, Central and South America, Asia, Europe and Oceania. South Africa is a signatory to this convention.

The Agreement on the Conservation of African-Eurasian Migratory Water birds (AEWA): is the largest of its kind developed so far under the CMS. The AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle, including many species of divers, grebes, pelicans, cormorants, herons, storks, rails, ibises, spoonbills, flamingos, ducks, swans, geese, cranes, waders, gulls, terns, tropic birds, auks, frigate birds and even the South African penguin. The agreement covers 119 countries and the European Union (EU) from Europe, parts of Asia and Canada, the Middle East and Africa.

The National Environmental Management – Biodiversity Act - Threatened or Protected Species list (TOPS). Those TOPS species relevant to this study and occurring on site are discussed in this report.

The National Environmental Management Act, No. 107 of 1998 (NEMA as amended): An Environmental Authorisation is required for Listed Activities in Regulations pursuant to NEMA. The avifaunal assessment feeds into the Scoping and EIA process to inform whether the project can proceed or not.

3. Potential interaction between birds & proposed project

Because of their size and prominence, electrical infrastructures constitute an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms, but two common problems in southern Africa are electrocution of birds (and other animals) and birds colliding with power lines (Ledger & Annegarn 1981; Ledger 1983; Ledger 1984; Hobbs & Ledger 1986a; Hobbs & Ledger 1986b; Ledger, Hobbs & Smith, 1992; Verdoorn 1996; Kruger & Van Rooyen 1998; Van Rooyen 1998; Kruger 1999; Van Rooyen 1999; Van Rooyen 2000). Other problems are electrical faults caused by bird excreta when roosting or breeding on electricity infrastructure, (Van Rooyen & Taylor 1999) and disturbance and habitat destruction during construction and maintenance activities.

3.1. Habitat destruction during construction

During the construction phase of almost any development, some habitat destruction and alteration inevitably takes place. This happens with the construction of the development itself, access roads,

and associated infrastructure. This is true of power lines and substations such as those proposed. Birds rely on habitat to meet their needs for foraging, drinking, resting, commuting and breeding. Of these it is probably breeding habitat which is most important to protect, although this varies between bird species. The significance of habitat destruction is influenced by a number of factors, including: size of area to be affected; sensitivity of receiving habitat; uniqueness of the habitat; degree of habitat specialisation of the bird species utilising the habitat; and the conservation status and sensitivity of the species using the habitat.

3.2. Disturbance of birds during construction of the proposed development

The construction and operational activities can impact on birds through disturbance, particularly during bird breeding activities. Particular project activities of concern include blasting, drilling, heavy earth moving general vehicular movement and any other activities which result in noise or increased human activity in an area. Disturbance of non-breeding birds may simply require them to move further away or adjust their activities during the disturbance. This may be either temporary or permanent. Disturbance of breeding birds may result in lower breeding productivity, failed breeding in the relevant season, and temporary or permanent abandonment of a breeding site. All of these reduce the recruitment of young birds to the population and can have significant implications for Red Listed species in particular, many of which are slow to reach breeding age and breed in small numbers.

3.3. Electrocuting of birds whilst perched on pylons

This is caused when a bird bridges the gap between either: a live and an earthed component (phase-earth electrocution); or two live phases (phase-phase electrocutions). This type of impact is a function of line design and the dimensions of the birds' extremities. Larger bird species have a greater chance of bridging the critical clearances, causing a short circuit and being electrocuted. This risk is fairly easily managed by designing the pylons in a bird friendly manner from the outset.

3.4. Collision of birds with overhead cables

Collisions are the biggest single threat posed by the larger overhead lines to birds in southern Africa (van Rooyen 2004). Most heavily impacted upon are bustards, storks, cranes and various species of water birds. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines (van Rooyen 2004, Anderson 2001).

The Red List bird species vulnerable to power line collisions are generally long living, slow reproducing species under natural conditions. Some require very specific conditions for breeding, resulting in very few successful breeding attempts, or breeding might be restricted to very small

areas. These species have not evolved to cope with high adult mortality, with the result that consistent high adult mortality over an extensive period could have a serious effect on a population’s ability to sustain itself in the long or even medium term. Many of the anthropogenic threats to these species are non-discriminatory as far as age is concerned (e.g. habitat destruction, disturbance and power lines) and therefore contribute to adult mortality, and it is not known what the cumulative effect of these impacts could be over the long term.

4. Description of the affected environment

4.1. Vegetation type & micro habitat

The site is comprised entirely of one vegetation type – “Vaal-Vet Sandy Grassland” as shown in Figure 4 (Mucina & Rutherford, 2018). This is an ‘Endangered’ and ‘Hardly Protected’ vegetation type.



Figure 4. Vegetation types on site (Mucina & Rutherford, 2018).

For avifaunal purposes, the site is predominantly grassland vegetation interspersed with some isolated thorn trees in places. The micro habitats available to birds on the site are: grassland; thorn trees; stands of exotic trees, and small pans. Examples of these are shown Appendix 3.

4.2. Avifaunal community

The first and second Southern African Bird Atlas Projects (Harrison *et al*, 1997; and www.sabap2.adu.org.za) recorded a combined total of approximately 273 bird species in the broader area within which the proposed project is located. These are the species which could occur on the proposed site if conditions are right, but they have not all necessarily been confirmed on the site. Included amongst these 273 species are a number of regionally and globally Red Listed bird species and a number of endemics. These species are the priority bird species for this assessment and are presented in Table 1. Our own brief field survey recorded 19 bird species (Appendix 2), including most importantly a pair of Secretarybird *Sagittarius serpentarius*.

Important Bird Areas

No Important Bird and Biodiversity Areas (IBA's) exist on or close to the site. The closest is the Soetdoring Nature Reserve approximately 30km south-east of the site. This is too far to be relevant to this study.

Coordinated Avifaunal Roadcounts

Two to three Coordinated Avifaunal Roadcount (CAR) routes are located close enough to the proposed site for their data to be relevant (Figure 5). The most relevant of these are: FS55 and FS65, which are both situated less than 3km from the proposed site at their closest point. CAR counts are a vehicle based census of birds (focussed on large terrestrial species) performed twice annually (in winter and summer) by volunteer birdwatchers. The purpose is to provide population data for use in science, especially conservation biology, by determining findings about the natural habitats and the birds that use them. Relevant bird species recorded regularly on the FS55 and FS65 routes include Blue Crane *Grus paradisea*, Northern Black Korhaan *Afrotis afraoides*, Secretarybird, and White Stork *Ciconia ciconia*.

Coordinated Waterbird Counts

Coordinated Waterbird Counts (CWAC) consist of a programme of mid-summer and midwinter censuses at a large number of South African wetlands. The counts are conducted by citizen scientists at more than 400 wetlands around the country and provide a useful source of information on wetland bird species in South Africa. No CWAC sites exist close enough to the proposed site to be relevant.

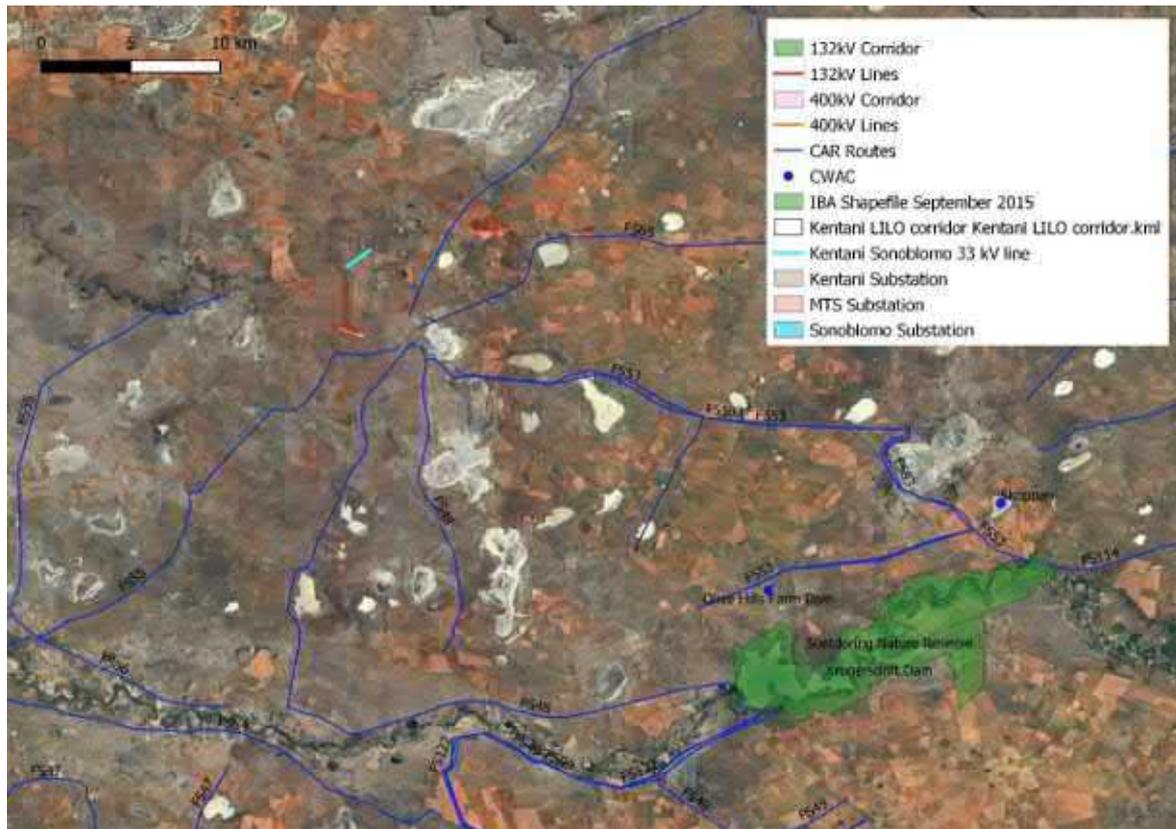


Figure 5. Avifaunal information for the site.

Appendix 2 presents the bird atlas data for the site and includes the species we recorded on the site. Table 1 summarises the priority bird species for the site and their likelihood of occurrence on site and possible impacts.

Three main ecological groups of bird species are relevant to this assessment:

1. Raptors – including White-backed Vulture, Martial *Polemaetus bellicosus* and Tawny Eagles *Aquila rapax*, Black Harrier *Circus maurus*, and Lanner Falcon *Falco biarmicus*. These species will occur throughout the site and will be at some risk of collision with the power line and electrocution on the power line.
2. Large terrestrial species – including Ludwig’s Bustard *Neotis ludwigii*, Blue Crane, Secretarybird, Kori Bustard *Ardeotis kori*. These species will occur mostly in the more open areas and will be at high risk of collision with overhead cables.
3. Small terrestrial species – such as pipits, larks, coursers, pratincoles, plovers, and many others. These species will occur on the site and be at risk of habitat destruction and disturbance.

Table 1. Priority bird species for the site.

Common name	Taxonomic name	Regional, Global, Endemic	SAB AP1	SAB AP2	Specialist survey	Likelihood of occurring on site	Potential impacts
Vulture, White-backed	<i>Gyps africanus</i>	CR, CR		1		Probable, confirmed nearby	Electrocution, collision
Harrier, Black	<i>Circus maurus</i>	EN, EN, NE	1	1		Possible	Collision, habitat destruction, disturbance
Bustard, Ludwig's	<i>Neotis ludwigii</i>	EN, EN	1	1		Possible	Collision, habitat destruction, disturbance
Stork, Yellow-billed	<i>Mycteria ibis</i>	EN, LC	1			Unlikely	-
Eagle, Martial	<i>Polemaetus bellicosus</i>	EN, VU	1			Possible	Electrocution, collision
Eagle, Tawny	<i>Aquila rapax</i>	EN, VU	1			Possible	Electrocution, collision
Courser, Burchell's	<i>Cursorius rufus</i>	VU, LC	1	1		Possible	Habitat destruction, disturbance
Falcon, Lanner	<i>Falco biarmicus</i>	VU, LC	1	1		Possible	Collision, habitat destruction, disturbance
Stork, Black	<i>Ciconia nigra</i>	VU, LC	1	1		Unlikely	-
Tern, Caspian	<i>Hydropogone caspia</i>	VU, LC	1	1		Unlikely	-
Pelican, Pink-backed	<i>Pelecanus rufescens</i>	VU, LC	1			Unlikely	-
Secretarybird	<i>Sagittarius serpentarius</i>	VU, VU	1	1	1	Confirmed	Collision, habitat destruction, disturbance
Pipit, African Rock	<i>Anthus crenatus</i>	NT, LC, SLS		1		Possible	Habitat destruction, disturbance
Flamingo, Greater	<i>Phoenicopterus roseus</i>	NT, LC	1	1		Unlikely	-
Roller, European	<i>Coracias garrulus</i>	NT, LC	1	1		Possible	Habitat destruction, disturbance
Stork, Abdim's	<i>Ciconia abdimii</i>	NT, LC	1	1		Possible	Collision, habitat destruction, disturbance
Bustard, Kori	<i>Ardeotis kori</i>	NT, NT	1	1		Possible	Collision, habitat destruction, disturbance
Flamingo, Lesser	<i>Phoeniconaias minor</i>	NT, NT	1	1		Unlikely	-
Pratincole, Black-winged	<i>Glareola nordmanni</i>	NT, NT	1	1		Possible	Habitat destruction, disturbance
Plover, Chestnut-banded	<i>Charadrius pallidus</i>	NT, NT		1		Possible	Habitat destruction, disturbance
Crane, Blue	<i>Grus paradisea</i>	NT, VU	1			Possible	Collision, habitat destruction, disturbance
Duck, Maccoa	<i>Oxyura maccoa</i>	NT, VU	1			Unlikely	-
Korhaan, Blue	<i>Eupodotis caerulescens</i>	LC, NT, SLS	1	1		Possible	Collision, habitat destruction, disturbance
Sandpiper, Curlew	<i>Calidris ferruginea</i>	LC, NT	1			Possible	Habitat destruction, disturbance
Egret, Slaty	<i>Egretta vinaceigula</i>	NA, VU	1	1		Unlikely	-
Swallow, South African Cliff	<i>Petrochelidon spilodera</i>	BSLS	1	1		Possible	Habitat destruction, disturbance

Common name	Taxonomic name	Regional, Global, Endemic	SAB AP1	SAB AP2	Specialist survey	Likelihood of occurring on site	Potential impacts
Bulbul, Cape	<i>Pycnonotus capensis</i>	E	1	1		Possible	Habitat destruction, disturbance
Buzzard, Jackal	<i>Buteo rufofuscus</i>	NE	1	1		Possible	Habitat destruction, disturbance
Chat, Sickle-winged	<i>Emarginata sinuata</i>	NE	1	1		Possible	Electrocution, habitat destruction, disturbance
Cisticola, Cloud	<i>Cisticola textrix</i>	NE	1	1		Possible	Habitat destruction, disturbance
Flycatcher, Fairy	<i>Stenostira scita</i>	NE	1	1		Possible	Habitat destruction, disturbance
Flycatcher, Fiscal	<i>Melaenornis silens</i>	NE	1	1		Possible	Habitat destruction, disturbance
Lark, Large-billed	<i>Galerida magnirostris</i>	NE	1	1	1	Confirmed	Habitat destruction, disturbance
Lark, Melodious	<i>Mirafra cheniana</i>	NE	1	1		Possible	Habitat destruction, disturbance
Thrush, Karoo	<i>Turdus smithi</i>	NE	1	1		Possible	Habitat destruction, disturbance
Warbler, Namaqua	<i>Phragmacia substriata</i>	NE	1	1		Possible	Habitat destruction, disturbance
White-eye, Cape	<i>Zosterops virens</i>	NE	1	1		Possible	Habitat destruction, disturbance
Canary, Black-headed	<i>Serinus alario</i>	NE	1			Possible	Habitat destruction, disturbance
Prinia, Karoo	<i>Prinia maculosa</i>	NE	1			Possible	Habitat destruction, disturbance
Tit-Babbler (Warbler), Layard's	<i>Sylvia layardi</i>	NE		1		Possible	Habitat destruction, disturbance
Starling, Pied	<i>Lamprotornis bicolor</i>	SLS	1	1	1	Confirmed	Habitat destruction, disturbance
Lark, Eastern Long-billed	<i>Certhilauda semitorquata</i>	SLS	1			Possible	Habitat destruction, disturbance
Prinia, Drakensberg	<i>Prinia hypoxantha</i>	SLS	1			Possible	Habitat destruction, disturbance

Regional: Red Data regional (Taylor et al, 2015). CR- Critically Endangered; EN-Endangered; VU-Vulnerable; NT-Near-threatened; LC-Least concern

Global: IUCN, 2021

Endemic: E-Endemic; NE-Near-endemic; SLS-Endemic to South Africa, Lesotho, Swaziland; BSLS=Endemic to Botswana, SA, Lesotho, Swaziland

SABAP1, 2 = Southern African Bird Atlas Project 1 and 2. '1' denotes presence, not abundance

5. Screening verification & Sensitivity mapping

5.1. Site sensitivity verification report

In accordance with GN 320 and GN 1150 (20 March 2020) of the NEMA EIA Regulations of 2014 (as amended), prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (i.e., Screening Tool).

We examined the Screening Tool output and found the following:

- MTS Substation – Animal Theme is classed as Medium sensitivity (Figure 6), with Ludwig’s Bustard highlighted. Avian Theme is not rated.
- The various power lines – Animal Theme is classed as Medium sensitivity (Figure 7), again with Ludwig’s Bustard highlighted. Avian Theme is not rated.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY

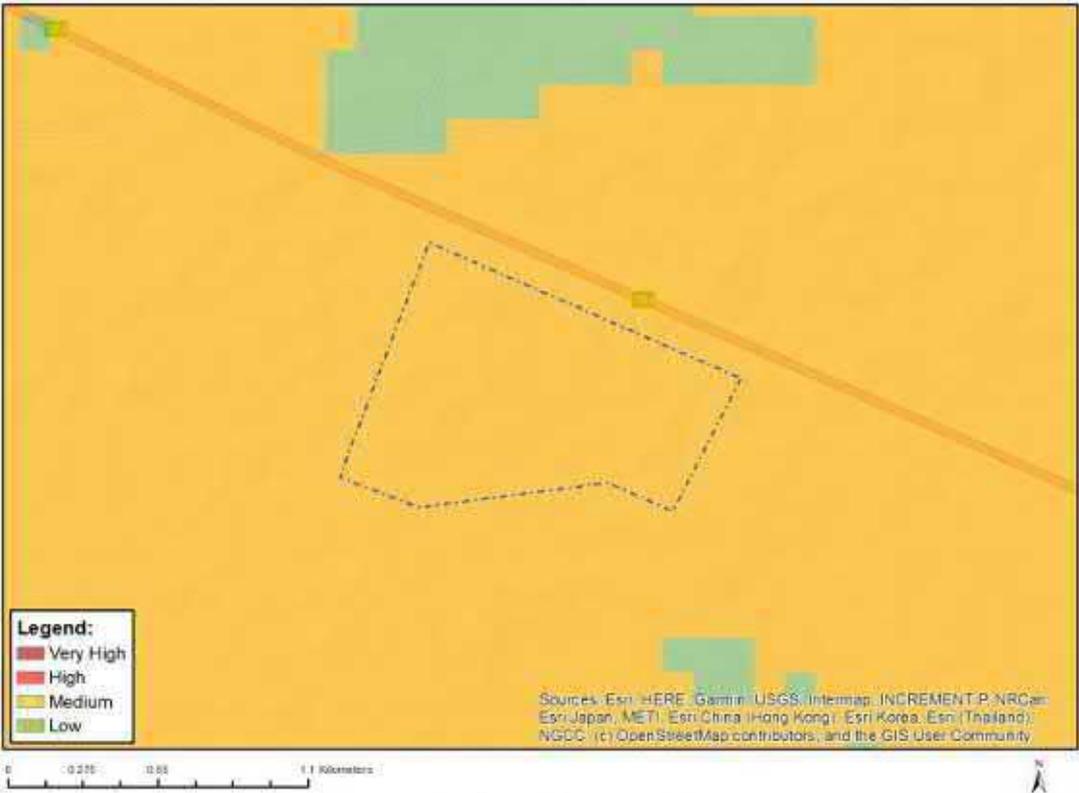
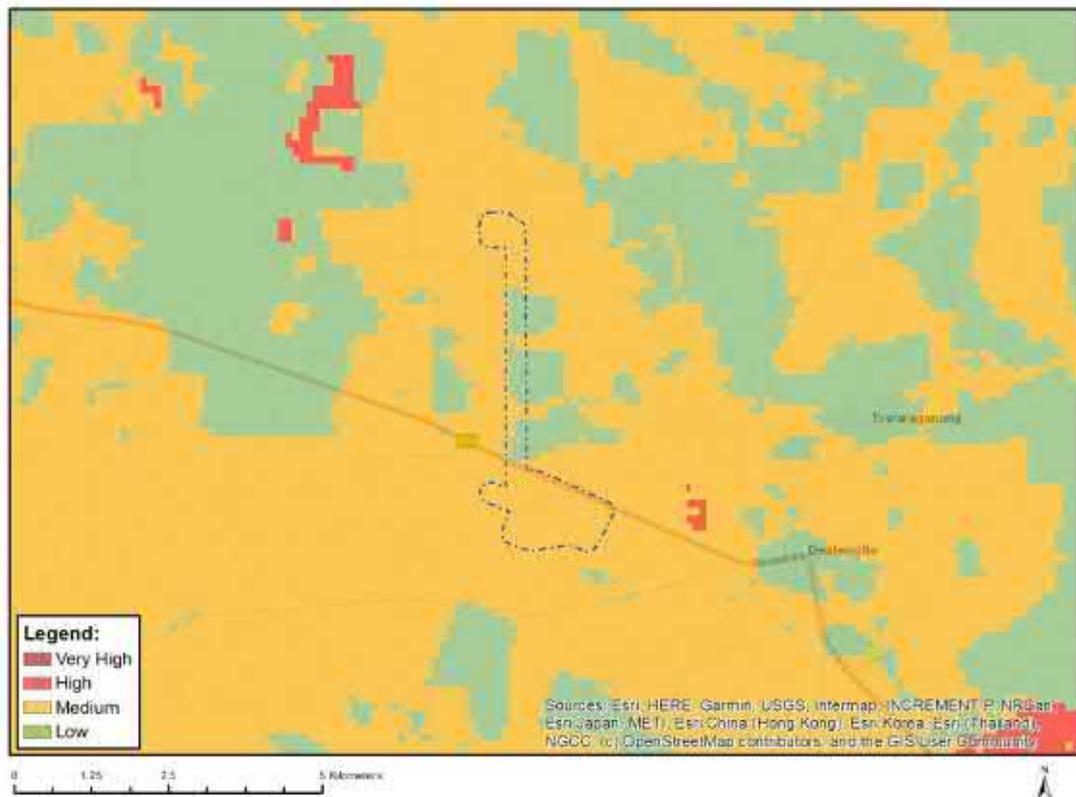


Figure 6. DEFF Screening Tool output for MTS Substation – Animal Theme.

Figure 7. DEFF Screening Tool output for power lines – Animal Theme.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



The environmental sensitivity of the proposed development area for the “Animal Theme” and by implication the “Avian Theme” (although not rated by the tool) was established by our own work as follows:

- desk top analysis, using all available data sources (specified in Section 2.4); and
- field survey on site as described in Section 2.3

Based on our work we confirm that the site is of Medium sensitivity for avifauna.

5.2. Site sensitivity mapping

There are no sensitive features on the site that can be identified spatially. The site is uniform in its sensitivity and no constraints or sensitivities exist.

6. Assessment of impacts

The impacts have been assessed formally below according to the criteria supplied by SLR (Appendix 1).

6.1. Destruction of bird habitat during construction of power line & substation

Table 2. Habitat destruction during construction

Issue	Habitat destruction during construction & maintenance	
Description of Impact		
The impact of habitat destruction will be of Low significance both pre and post mitigation. The amount of habitat to be transformed for the MTS substation and the associated power lines is relatively small in this landscape and the habitat is not particularly unique or limited in availability. We recommend several mitigation measures which will slightly reduce the impact significance, but not sufficiently to reduce below Low.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Low	Low
Duration	Long-term	Long-term
Extent	Site	Site
Consequence	Low	Low
Probability	Probable	Probable
Significance	Low -	Low -
Degree to which impact can be reversed	Low - natural habitat will be transformed	
Degree to which impact may cause irreplaceable loss of resources	High - habitat will not easily be restored to original state	
Degree to which impact can be mitigated	Low - certain amount of habitat transformation is inevitable	
Mitigation actions		
The following measures are recommended:	<ul style="list-style-type: none"> • A pre-construction avifaunal walk down should be conducted to: <ul style="list-style-type: none"> ○ Confirm final layout and identify any sensitivities that may arise between the conclusion of the BA process and the construction phase. ○ Identify any sensitive species breeding on site that may arise between the conclusion of the BA process and the construction phase. • All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. • All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction. 	
Monitoring		
The following monitoring is recommended:	N/A	

6.2. Disturbance of birds during construction of the power line & substation

Table 3. Disturbance of birds during construction

Issue	Disturbance of birds during construction	
Description of Impact		
We judge the significance of this impact to be Low for both pre and post mitigation. Disturbance of birds typically reaches significant levels when the receptor is a breeding site for a sensitive species, or some other important feature, such as a roost. We have identified no such features on site.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Low	Low
Duration	Short-term	Short-term
Extent	Local	Local
Consequence	Low	Low
Probability	Possible / frequent	Possible / frequent
Significance	Low -	Low -
Degree to which impact can be reversed	Highly reversible, as soon as construction stops impact will cease	
Degree to which impact may cause irreplaceable loss of resources	Low - any impacts are reversible and no irreplaceable loss	
Degree to which impact can be mitigated	Low - certain amount of disturbance during construction is inevitable	
Mitigation actions		
The following measures are recommended:	<ul style="list-style-type: none"> • A pre-construction avifaunal walk down should be conducted to: <ul style="list-style-type: none"> ○ Confirm final layout and identify any sensitivities that may arise between the conclusion of the BA process and the construction phase. ○ Identify any sensitive species breeding on site that may arise between the conclusion of the BA process and the construction phase. • All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. • All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction. 	
Monitoring		
The following monitoring is recommended:	N/A	

6.3. Collision of birds with overhead cables during operations of the power line

Table 4. Collision of birds with overhead cables during operations

Issue	Collision of birds with overhead cables
Description of Impact	
We judge the significance of this impact to be Medium pre and Low post mitigation. Several regionally Red Listed bird species which are known to be susceptible to collision with overhead power lines occur in the study area, including Ludwig's Bustard, Blue Crane and Secretarybird. The significance of this risk is slightly diminished by the placement of the proposed power line within a corridor of existing power lines	

(some of which are higher above the ground than the proposed line and will provide some shielding for birds in flight).		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operation	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Medium
Duration	Long-term	Long-term
Extent	Regional	Regional
Consequence	Medium	Medium
Probability	Probable	Conceivable
Significance	Medium -	Low -
Degree to which impact can be reversed	Low - birds are killed	
Degree to which impact may cause irreplaceable loss of resources	High - birds are killed	
Degree to which impact can be mitigated	High	
Mitigation actions		
The following measures are recommended:	<ul style="list-style-type: none"> • A pre-construction avifaunal walk down should be conducted to provide final confirmation of the sections of power line requiring bird collision mitigation. • The overhead cables on high risk sections of the alignments (should be fitted with an approved anti bird collision line marking device to make cables more visible to birds in flight and reduce the likelihood of collisions. This should be done according to the Eskom Distribution and Transmission standards in terms of device spacing and other factors. Literature around the world points towards a 50-60% reduction in bird collision risk if the line is marked (Jenkins, Smallie & Diamond, 2010; Shaw et al, 2021). The line marking device should be a dynamic (moving – bird flapper type) device. 	
Monitoring		
The following monitoring is recommended:	<p>The new power line should be patrolled during operation by ESKOM annually to measure any impacts on birds (through detecting collision fatalities) and to monitor the durability of the line marking devices</p> <p>Where multiple devices on a span have failed they should be replaced immediately. Data should be submitted to the Eskom –EWT Strategic Partnership where it will be curated and publicly accessible.</p>	

6.4. Electrocutation of birds on pylons during operations of the power line

Table 5. Electrocutation of birds on pylons during operations

Issue	Electrocutation of birds perched on power lines
Description of Impact	
<p>The significance of bird electrocutation on the proposed power lines will be of Low significance pre mitigation since the proposed pylon structures have phase-phase and phase-earth clearances greater than 1800mm so even vultures and large eagles can perch safely without bridging these critical clearances. It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted</p>	

to all pole tops to further provide safe perching substrate well above dangerous hardware. It is also essential that if any of the pylon structures are changed we are given opportunity to assess the electrocution risk of the new structure and design mitigation.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operation	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Medium
Duration	Long-term	Long-term
Extent	Regional	Regional
Consequence	Medium	Medium
Probability	Conceivable	Conceivable
Significance	Low -	Low -
Degree to which impact can be reversed	Low - birds are killed	
Degree to which impact may cause irreplaceable loss of resources	High - birds are killed	
Degree to which impact can be mitigated	Very high - It is possible to mitigate this fully by designing the power lines correctly	
Mitigation actions		
The following measures are recommended:	<ul style="list-style-type: none"> • It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching space well above dangerous hardware. • It is also essential that if any of the pylon structures are changed we are given opportunity to assess the electrocution risk of the new structures and design mitigation. 	

6.5. Cumulative impacts of the proposed project

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 time² 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

² 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.

eleven (11) authorised solar PV projects and associated electrical infrastructure. According to the information available at the time², 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 Faraday PV solar projects and associated infrastructure - [14/12/16/3/3/2/855](#)
- 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 and power line 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 8 summarises the above information.

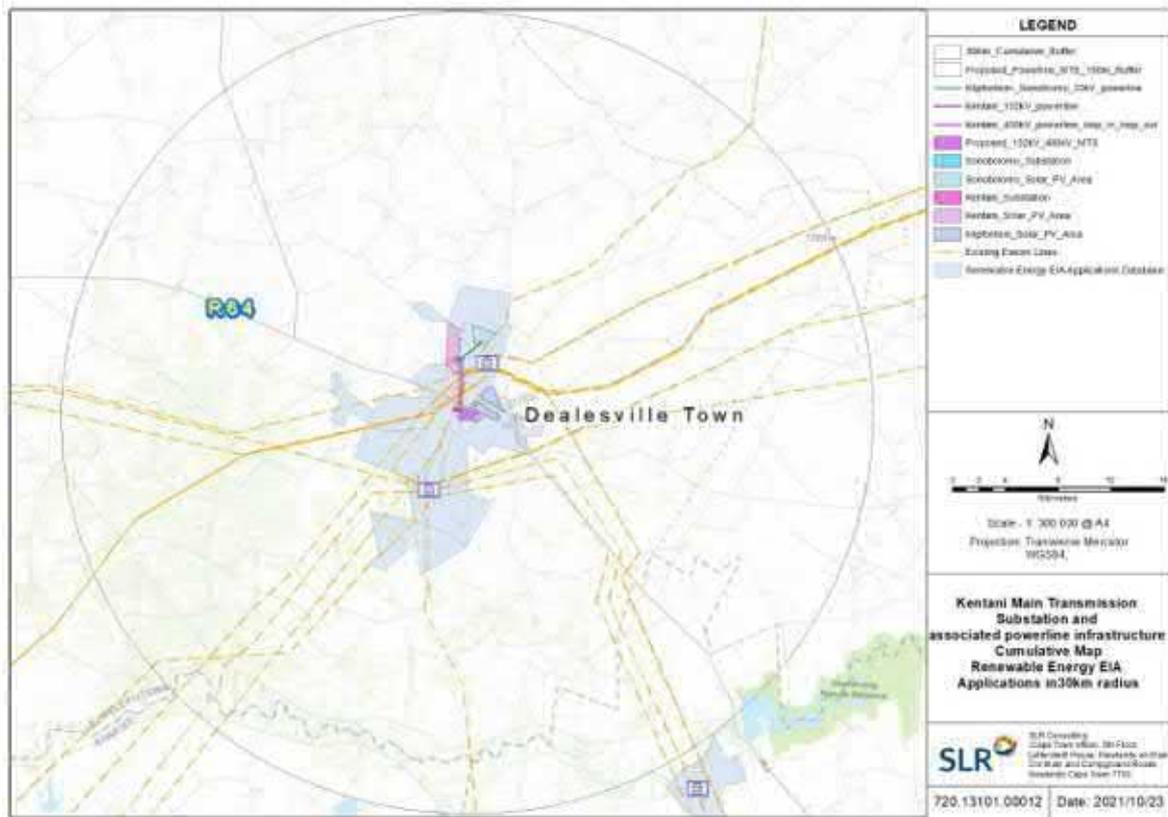


Figure 8. Cumulative Map indicating REFs within the 30km buffer of the proposed MTS and Power lines (including Powerline Corridors)

Table 6. Cumulative impacts of renewable energy & electrical infrastructure on birds.

Issue	Cumulative impacts of renewable energy & electrical infrastructure on birds	
Description of Impact		
Overall we judge the cumulative impact of power lines, substations and renewable energy on avifauna in the area to be of Medium (-) significance pre-mitigation. If all proposed facilities implement mitigation correctly this can be reduced to Low (-).		
Cumulative impacts		
Nature of cumulative impacts	The two direct impacts of collision & electrocution are relatively easily mitigated as presented in the Impact Assessment Tables in Section 6.1-6.4.	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Medium -	Low -

7. Assessment of 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.

8. Required mitigation measures

To summarise, the following mitigation measures are necessary:

- A pre-construction avifaunal walk down should be conducted to:
 - Confirm final layout and identify any sensitivities that may arise between the conclusion of the BA process and the construction phase.
 - Identify any sensitive species breeding on site that may arise between the conclusion of the BA process and the construction phase.
- All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment.
- All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction.

- A pre-construction avifaunal walk down should be conducted to provide final confirmation of the sections of power line requiring bird collision mitigation.
- The overhead cables on high risk sections of the alignments (should be fitted with an approved anti bird collision line marking device to make cables more visible to birds in flight and reduce the likelihood of collisions. This should be done according to the Eskom Distribution and Transmission standards in terms of device spacing and other factors. Literature around the world points towards a 50-60% reduction in bird collision risk if the line is marked (Jenkins, Smallie & Diamond, 2010; Shaw *et al*, 2021). The line marking device should be a dynamic (moving – bird flapper type) device. The new power line should be patrolled by Mainstream annually to measure any impacts on birds (through detecting collision fatalities) and to monitor the durability of the line marking devices. Where multiple devices on a span have failed they should be replaced immediately. Data should be submitted to the Eskom –EWT Strategic Partnership where it will be curated and publicly accessible.
- It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching substrate well above dangerous hardware.
- It is also essential that if any of the pylon structures are changed we are given opportunity to assess the electrocution risk of the new structure and design mitigation measures.

9. Conclusions

Up to approximately 273 bird species occur in the broader area within which the proposed project is located. Included amongst these 273 species are a number of regionally and globally Red Listed bird species and a number of endemics. These include most importantly: 1 Critically Endangered species, White-backed Vulture; and 4 Endangered species – Black Harrier, Ludwig’s Bustard, Yellow-billed Stork, Martial Eagle and Tawny Eagle; 6 Vulnerable species; and 10 Near-threatened species.

Based on the formal criteria supplied by SLR, we have rated the potential impacts on avifauna as follows:

Phase	Impact	Pre-mitigation	Post mitigation
Construction	Habitat destruction	Low	Low
	Disturbance of birds	Low	Low
Operations	Collision of birds with overhead cables	Medium	Low
	Electrocution of birds perching on pylons	Low	Low
Cumulative impacts	Cumulative impacts of the project on birds	Medium	Low

These impacts will require the following mitigation measures to be implemented:

- A pre-construction avifaunal walk down should be conducted to:
 - Confirm final layout and identify any sensitivities that may arise between the conclusion of the BA process and the construction phase.
 - Identify any sensitive species breeding on site that may arise between the conclusion of the BA process and the construction phase.
- All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment.
- All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction.
- A pre-construction avifaunal walk down should be conducted to provide final confirmation of the sections of power line requiring bird collision mitigation.
- The overhead cables on high risk sections of the alignments (should be fitted with an approved anti bird collision line marking device to make cables more visible to birds in flight and reduce the likelihood of collisions. This should be done according to the Eskom Distribution and Transmission standards in terms of device spacing and other factors. Literature around the world points towards a 50-60% reduction in bird collision risk if the line is marked (Jenkins, Smallie & Diamond, 2010; Shaw *et al*, 2021). The line marking device should be a dynamic (moving – bird flapper type) device. The new power line should be patrolled by Mainstream annually to measure any impacts on birds (through detecting collision fatalities) and to monitor the durability of the line marking devices. Where multiple devices on a span have failed they should be replaced immediately. Data should be submitted to the Eskom –EWT Strategic Partnership where it will be curated and publicly accessible.
- It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching substrate well above dangerous hardware.
- It is also essential that if any of the pylon structures are changed we are given opportunity to assess the electrocution risk of the new structure and design mitigation measures.

If these mitigation measures are implemented correctly we believe that the impacts of the proposed project will be at an acceptable level and we recommend the proposed project be authorised to proceed.

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Appendix 1. Impact assessment criteria

The impacts of the proposed development (during the Pre-Construction, Construction, Operation and Decommissioning phases) are to be assessed and rated according to the methodology described below, which was developed by SLR to align with the requirements of the EIA Regulations, 2014 (as amended).

The criteria used to assess both the impacts and the method of determining the significance of the impacts is outlined in Table 1. This method complies with the method provided in the EIA guideline document (GN 654 of 2010). Part A provides the definitions of the criteria and the approach for determining impact consequence (combining intensity, extent and duration). In Part B, a matrix is applied to determine this impact consequence. In Part C, the consequence rating is considered together with the probability of occurrence in order to determine the overall significance of each impact. Lastly, the interpretation of the impact significance is provided in Part D.

Table 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.				

The specialists are also required to include a comment, as follows, on the degree to which the impact:

1. Can be reversed;
2. May cause irreplaceable loss of resources; and
3. Can be avoided, managed or mitigated.

Appendix 2. Bird data for the site

Regional: Red Data regional (Taylor et al, 2015). CR- Critically Endangered; EN-Endangered; VU-Vulnerable; NT-Near-threatened; LC-Least concern

Global: IUCN, 2021

Endemic: E-Endemic; NE-Near-endemic; SLS-Endemic to South Africa, Lesotho, Swaziland; BSLS=Endemic to Botswana, SA, Lesotho, Swaziland

SABAP1, 2 = Southern African Bird Atlas Project 1 and 2. '1' denotes presence, not abundance

Specialist site visit = recorded on the specialists site visit in September 2021

Common name	Taxonomic Name	Regional, Global, Endemic	SAB AP1	SAB AP2	Specialist survey
Vulture, White-backed	<i>Gyps africanus</i>	CR, CR		1	
Harrier, Black	<i>Circus maurus</i>	EN, EN, NE	1	1	
Bustard, Ludwig's	<i>Neotis ludwigii</i>	EN, EN	1	1	
Stork, Yellow-billed	<i>Mycteria ibis</i>	EN, LC	1		
Eagle, Martial	<i>Polemaetus bellicosus</i>	EN, VU	1		
Eagle, Tawny	<i>Aquila rapax</i>	EN, VU	1		
Cursorer, Burchell's	<i>Cursorius rufus</i>	VU, LC	1	1	
Falcon, Lanner	<i>Falco biarmicus</i>	VU, LC	1	1	
Stork, Black	<i>Ciconia nigra</i>	VU, LC	1	1	
Tern, Caspian	<i>Hydropogone caspia</i>	VU, LC	1	1	
Pelican, Pink-backed	<i>Pelecanus rufescens</i>	VU, LC	1		
Secretarybird	<i>Sagittarius serpentarius</i>	VU, VU	1	1	1
Pipit, African Rock	<i>Anthus crenatus</i>	NT, LC, SLS		1	
Flamingo, Greater	<i>Phoenicopterus roseus</i>	NT, LC	1	1	
Roller, European	<i>Coracias garrulus</i>	NT, LC	1	1	
Stork, Abdim's	<i>Ciconia abdimii</i>	NT, LC	1	1	
Bustard, Kori	<i>Ardeotis kori</i>	NT, NT	1	1	
Flamingo, Lesser	<i>Phoeniconaias minor</i>	NT, NT	1	1	
Pratincole, Black-winged	<i>Glareola nordmanni</i>	NT, NT	1	1	
Plover, Chestnut-banded	<i>Charadrius pallidus</i>	NT, NT		1	
Crane, Blue	<i>Grus paradisea</i>	NT, VU	1		
Duck, Maccoa	<i>Oxyura maccoa</i>	NT, VU	1		
Korhaan, Blue	<i>Eupodotis caerulescens</i>	LC, NT, SLS	1	1	
Sandpiper, Curlew	<i>Calidris ferruginea</i>	LC, NT	1		
Egret, Slaty	<i>Egretta vinaceigula</i>	NA, VU	1	1	
Swallow, South African Cliff	<i>Petrochelidon spilodera</i>	BSLS	1	1	
Bulbul, Cape	<i>Pycnonotus capensis</i>	E	1	1	
Buzzard, Jackal	<i>Buteo rufofuscus</i>	NE	1	1	
Chat, Sickle-winged	<i>Emarginata sinuata</i>	NE	1	1	
Cisticola, Cloud	<i>Cisticola textrix</i>	NE	1	1	
Flycatcher, Fairy	<i>Stenostira scita</i>	NE	1	1	
Flycatcher, Fiscal	<i>Melaenornis silens</i>	NE	1	1	
Lark, Large-billed	<i>Galerida magnirostris</i>	NE	1	1	1

Lark, Melodious	<i>Mirafra cheniana</i>	NE	1	1	
Thrush, Karoo	<i>Turdus smithi</i>	NE	1	1	
Warbler, Namaqua	<i>Phragmacia substriata</i>	NE	1	1	
White-eye, Cape	<i>Zosterops virens</i>	NE	1	1	
Canary, Black-headed	<i>Serinus alario</i>	NE	1		
Prinia, Karoo	<i>Prinia maculosa</i>	NE	1		
Tit-Babbler (Warbler), Layard's	<i>Sylvia layardi</i>	NE		1	
Starling, Pied	<i>Lamprotornis bicolor</i>	SLS	1	1	1
Lark, Eastern Long-billed	<i>Certhilauda semitorquata</i>	SLS	1		
Prinia, Drakensberg	<i>Prinia hypoxantha</i>	SLS	1		
Avocet, Pied	<i>Recurvirostra avosetta</i>		1	1	
Barbet, Acacia Pied	<i>Tricholaema leucomelas</i>		1	1	
Barbet, Crested	<i>Trachyphonus vaillantii</i>		1	1	
Batis, Pririt	<i>Batis pririt</i>		1	1	
Bee-eater, European	<i>Merops apiaster</i>		1	1	
Bee-eater, White-fronted	<i>Merops bullockoides</i>		1	1	
Bishop, Southern Red	<i>Euplectes orix</i>		1	1	
Bishop, Yellow-crowned	<i>Euplectes afer</i>		1	1	
Bokmakierie	<i>Telophorus zeylonus</i>		1	1	
Bulbul, African Red-eyed	<i>Pycnonotus nigricans</i>		1	1	
Bunting, Cinnamon-breasted	<i>Emberiza tahapisi</i>		1	1	
Bunting, Lark-like	<i>Emberiza impetuani</i>		1	1	
Buttonquail, Common (Kurrichane)	<i>Turnix sylvaticus</i>		1	1	
Buzzard, Common (Steppe)	<i>Buteo buteo</i>		1	1	
Canary, Black-throated	<i>Crithagra atrogularis</i>		1	1	
Canary, Yellow	<i>Crithagra flaviventris</i>		1	1	
Chat, Ant-eating	<i>Myrmecocichla formicivora</i>		1	1	1
Chat, Familiar	<i>Oenathe familiaris</i>		1	1	
Chat, Karoo	<i>Emarginata schlegelii</i>		1	1	
Cisticola, Desert	<i>Cisticola aridulus</i>		1	1	1
Cisticola, Levallant's	<i>Cisticola tinniens</i>		1	1	
Cisticola, Zitting	<i>Cisticola juncidis</i>		1	1	
Coot, Red-knobbed	<i>Fulica cristata</i>		1	1	
Cormorant, Reed	<i>Microcarbo africanus</i>		1	1	
Cormorant, White-breasted	<i>Phalacrocorax lucidus</i>		1	1	
Courser, Double-banded	<i>Rhinoptilus africanus</i>		1	1	1
Courser, Temminck's	<i>Cursorius temminckii</i>		1	1	
Crombec, Long-billed	<i>Sylvietta rufescens</i>		1	1	
Crow, Pied	<i>Corvus albus</i>		1	1	
Cuckoo, Diederik	<i>Chrysococcyx caprius</i>		1	1	
Cuckoo, Jacobin	<i>Clamator jacobinus</i>		1	1	
Cuckoo, Red-chested	<i>Cuculus solitarius</i>		1	1	
Darter, African	<i>Anhinga rufa</i>		1	1	
Dove, Cape Turtle (Ring-necked)	<i>Streptopelia capicola</i>		1	1	
Dove, Laughing	<i>Spilopelia senegalensis</i>		1	1	1
Dove, Namaqua	<i>Oena capensis</i>		1	1	
Dove, Red-eyed	<i>Streptopelia semitorquata</i>		1	1	1
Dove, Rock	<i>Columba livia</i>		1	1	

Drongo, Fork-tailed	<i>Dicrurus adsimilis</i>		1	1	
Duck, African Black	<i>Anas sparsa</i>		1	1	
Duck, White-faced Whistling	<i>Dendrocygna viduata</i>		1	1	
Duck, Yellow-billed	<i>Anas undulata</i>		1	1	
Eagle, African Fish	<i>Haliaeetus vocifer</i>		1	1	
Egret, Great	<i>Ardea alba</i>		1	1	
Egret, Western Cattle	<i>Bubulcus ibis</i>		1	1	
Egret, Yellow-billed (Intermediate)	<i>Ardea intermedia</i>		1	1	
Eremomela, Yellow-bellied	<i>Eremomela icteropygialis</i>		1	1	
Falcon, Amur	<i>Falco amurensis</i>		1	1	
Finch, Red-headed	<i>Amadina erythrocephala</i>		1	1	
Finch (Weaver), Scaly-feathered	<i>Sporopipes squamifrons</i>		1	1	
Firefinch, Red-billed	<i>Lagonosticta senegala</i>		1	1	
Fiscal, Southern (Common)	<i>Lanius collaris</i>		1	1	1
Flycatcher, Chat	<i>Melaenornis infuscatus</i>		1	1	
Flycatcher, Spotted	<i>Muscicapa striata</i>		1	1	
Francolin, Orange River	<i>Scleroptila gutturalis</i>		1	1	1
Goose, Egyptian	<i>Alopochen aegyptiaca</i>		1	1	
Goose, Spur-winged	<i>Plectropterus gambensis</i>		1	1	
Goshawk, Gabar	<i>Micronisus gabar</i>		1	1	
Goshawk, Pale Chanting	<i>Melierax canorus</i>		1	1	
Grebe, Little	<i>Tachybaptus ruficollis</i>		1	1	
Greenshank, Common	<i>Tringa nebularia</i>		1	1	
Guineafowl, Helmeted	<i>Numida meleagris</i>		1	1	
Gull, Grey-headed	<i>Chroicocephalus cirrocephalus</i>		1	1	
Hamerkop	<i>Scopus umbretta</i>		1	1	
Heron, Black-crowned Night	<i>Nycticorax nycticorax</i>		1	1	
Heron, Black-headed	<i>Ardea melanocephala</i>		1	1	
Heron, Goliath	<i>Ardea goliath</i>		1	1	
Heron, Grey	<i>Ardea cinerea</i>		1	1	
Hoopoe, African	<i>Upupa africana</i>		1	1	
Ibis, African Sacred	<i>Threskiornis aethiopicus</i>		1	1	
Ibis, Glossy	<i>Plegadis falcinellus</i>		1	1	
Ibis, Hadeda (Hadada)	<i>Bostrychia hagedash</i>		1	1	
Kestrel, Greater	<i>Falco rupicoloides</i>		1	1	1
Kestrel, Lesser	<i>Falco naumanni</i>		1	1	
Kestrel, Rock	<i>Falco rupicolus</i>		1	1	
Kingfisher, Brown-hooded	<i>Halcyon albiventris</i>		1	1	
Kingfisher, Malachite	<i>Corythornis cristatus</i>		1	1	
Kingfisher, Pied	<i>Ceryle rudis</i>		1	1	
Kite, Black-winged	<i>Elanus caeruleus</i>		1	1	
Lapwing, Blacksmith	<i>Vanellus armatus</i>		1	1	
Lapwing, Crowned	<i>Vanellus coronatus</i>		1	1	1
Lark, Chestnut-backed Sparrow-	<i>Eremopterix leucotis</i>		1	1	
Lark, Eastern Clapper	<i>Mirafra fasciolata</i>		1	1	1
Lark, Fawn-coloured	<i>Calendulauda africanoides</i>		1	1	
Lark, Grey-backed Sparrow	<i>Eremopterix verticalis</i>		1	1	
Lark, Pink-billed	<i>Spizocorys conirostris</i>		1	1	

Lark, Red-capped	<i>Calandrella cinerea</i>		1	1	
Lark, Rufous-naped	<i>Mirafra africana</i>		1	1	
Lark, Sabota	<i>Calendulauda sabota</i>		1	1	
Lark, Spike-heeled	<i>Chersomanes albofasciata</i>		1	1	1
Longclaw, Cape	<i>Macronyx capensis</i>		1	1	
Martin, Brown-throated	<i>Riparia paludicola</i>		1	1	
Martin, Rock	<i>Ptyonoprogne fuligula</i>		1	1	
Moorhen, Common	<i>Gallinula chloropus</i>		1	1	
Mousebird, Red-faced	<i>Urocolius indicus</i>		1	1	
Mousebird, Speckled	<i>Colius striatus</i>		1	1	
Mousebird, White-backed	<i>Colius colius</i>		1	1	
Neddicky	<i>Cisticola fulvicapilla</i>		1	1	
Ostrich, Common	<i>Struthio camelus</i>		1	1	
Owl, Spotted Eagle-	<i>Bubo africanus</i>		1	1	
Owl, Western Barn	<i>Tyto alba</i>		1	1	
Pigeon, Speckled	<i>Columba guinea</i>		1	1	
Pipit, African	<i>Anthus cinnamomeus</i>		1	1	1
Pipit, Buffy	<i>Anthus vaalensis</i>		1	1	
Pipit, Plain-backed	<i>Anthus leucophrys</i>		1	1	
Plover, Kittlitz's	<i>Charadrius pecuarius</i>		1	1	
Plover, Three-banded	<i>Charadrius tricollaris</i>		1	1	
Prinia, Black-chested	<i>Prinia flavicans</i>		1	1	
Quail-finch, African	<i>Ortygospiza atricollis</i>		1	1	
Quail, Common	<i>Coturnix coturnix</i>		1	1	
Quelea, Red-billed	<i>Quelea quelea</i>		1	1	
Robin-chat, Cape	<i>Cossypha caffra</i>		1	1	
Robin, Kalahari Scrub	<i>Cercotrichas paena</i>		1	1	
Robin, Karoo Scrub	<i>Cercotrichas coryphoeus</i>		1	1	
Sandgrouse, Namaqua	<i>Pterocles namaqua</i>		1	1	
Sandpiper, Common	<i>Actitis hypoleucos</i>		1	1	
Sandpiper, Marsh	<i>Tringa stagnatilis</i>		1	1	
Scimitarbill, Common	<i>Rhinopomastus cyanomelas</i>		1	1	
Shelduck, South African	<i>Tadorna cana</i>		1	1	
Shoveler, Cape	<i>Spatula smithii</i>		1	1	
Shrike, Lesser Grey	<i>Lanius minor</i>		1	1	
Shrike, Red-backed	<i>Lanius collurio</i>		1	1	
Sparrow-weaver, White-browed	<i>Plocepasser mahali</i>		1	1	1
Sparrow, Cape	<i>Passer melanurus</i>		1	1	
Sparrow, House	<i>Passer domesticus</i>		1	1	
Sparrow, Southern Grey-headed	<i>Passer diffusus</i>		1	1	1
Spoonbill, African	<i>Platalea alba</i>		1	1	
Spurfowl, Natal	<i>Pternistis natalensis</i>		1	1	
Spurfowl, Swainson's	<i>Pternistis swainsonii</i>		1	1	
Starling, Cape Glossy (Cape)	<i>Lamprotornis nitens</i>		1	1	
Starling, Wattled	<i>Creatophora cinerea</i>		1	1	
Stilt, Black-winged	<i>Himantopus himantopus</i>		1	1	
Stonechat, African	<i>Saxicola torquatus</i>		1	1	
Stork, White	<i>Ciconia ciconia</i>		1	1	

Swallow, Barn	<i>Hirundo rustica</i>		1	1	
Swallow, Greater Striped	<i>Cecropis cucullata</i>		1	1	1
Swallow, Pearl-breasted	<i>Hirundo dimidiata</i>		1	1	
Swallow, Red-breasted	<i>Cecropis semirufa</i>		1	1	
Swallow, White-throated	<i>Hirundo albigularis</i>		1	1	
Swift, Alpine	<i>Tachymarptis melba</i>		1	1	
Swift, Common	<i>Apus apus</i>		1	1	
Swift, Horus	<i>Apus horus</i>		1	1	
Swift, Little	<i>Apus affinis</i>		1	1	
Swift, White-rumped	<i>Apus caffer</i>		1	1	
Tchagra, Brown-crowned	<i>Tchagra australis</i>		1	1	
Teal, Cape	<i>Anas capensis</i>		1	1	
Teal, Red-billed	<i>Anas erythrorhyncha</i>		1	1	
Tern, Whiskered	<i>Chlidonias hybrida</i>		1	1	
Thick-knee, Spotted	<i>Burhinus capensis</i>		1	1	
Tit-Babbler (Warbler), Chestnut-vented	<i>Sylvia subcoerulea</i>		1	1	
Tit, Ashy	<i>Melaniparus cinerascens</i>		1	1	
Wagtail, Cape	<i>Motacilla capensis</i>		1	1	
Warbler, African Reed	<i>Acrocephalus baeticatus</i>		1	1	
Warbler, Lesser Swamp	<i>Acrocephalus gracilirostris</i>		1	1	
Warbler, Rufous-eared	<i>Malcorus pectoralis</i>		1	1	
Warbler, Willow	<i>Phylloscopus trochilus</i>		1	1	
Waxbill, Black-faced	<i>Estrilda erythronotos</i>		1	1	
Waxbill, Common	<i>Estrilda astrild</i>		1	1	
Waxbill, Violet-eared	<i>Uraeginthus granatinus</i>		1	1	
Weaver, Southern Masked	<i>Ploceus velatus</i>		1	1	
Wheatear, Capped	<i>Oenanthe pileata</i>		1	1	
Wheatear, Mountain	<i>Myrmecocichla monticola</i>		1	1	
White-eye, Orange River	<i>Zosterops pallidus</i>		1	1	
Whydah, Pin-tailed	<i>Vidua macroura</i>		1	1	
Whydah, Shaft-tailed	<i>Vidua regia</i>		1	1	
Widowbird, Long-tailed	<i>Euplectes progne</i>		1	1	
Canary, Cape	<i>Serinus canicollis</i>		1		
Canary, White-throated	<i>Crithagra albogularis</i>		1		
Cisticola, Rattling	<i>Cisticola chiniana</i>		1		
Duck, Fulvous Whistling	<i>Dendrocygna bicolor</i>		1		
Duck, White-backed	<i>Thalassornis leuconotus</i>		1		
Firefinch, African	<i>Lagonosticta rubricata</i>		1		
Flycatcher, African Paradise	<i>Terpsiphone viridis</i>		1		
Grebe, Black-necked	<i>Podiceps nigricollis</i>		1		
Grebe, Great Crested	<i>Podiceps cristatus</i>		1		
Gull, Lesser Black-backed	<i>Larus fuscus</i>		1		
Heron, Purple	<i>Ardea purpurea</i>		1		
Honeyguide, Greater	<i>Indicator indicator</i>		1		
Indigobird, Village	<i>Vidua chalybeata</i>		1		
Kingfisher, Giant	<i>Megaceryle maxima</i>		1		
Lark, Karoo Long-billed	<i>Certhilauda subcoronata</i>		1		
Nightjar, Rufous-cheeked	<i>Caprimulgus rufigena</i>		1		

Plover, Common Ringed	<i>Charadrius hiaticula</i>		1	
Pochard, Southern	<i>Netta erythrophthalma</i>		1	
Ruff	<i>Calidris pugnax</i>		1	
Sandpiper, Wood	<i>Tringa glareola</i>		1	
Snipe, African	<i>Gallinago nigripennis</i>		1	
Stint, Little	<i>Calidris minuta</i>		1	
Swamphen, African (Purple)	<i>Porphyrio madagascariensis</i>		1	
Swift, African Black	<i>Apus barbatus</i>		1	
Teal, Hottentot	<i>Spatula hottentota</i>		1	
Tern, White-winged	<i>Chlidonias leucopterus</i>		1	
Thrush, Olive	<i>Turdus olivaceus</i>		1	
Wagtail, Western Yellow	<i>Motacilla flava</i>		1	
Warbler, Great Reed	<i>Acrocephalus arundinaceus</i>		1	
Waxbill, Blue	<i>Uraeginthus angolensis</i>		1	
Weaver, Sociable	<i>Philetairus socius</i>		1	
Bee-eater, Swallow-tailed	<i>Merops hirundineus</i>			1
Bittern, Little	<i>Ixobrychus minutus</i>			1
Brubru	<i>Nilaus afer</i>			1
Cisticola, Grey-backed	<i>Cisticola subruficapilla</i>			1
Coucal, Burchell's	<i>Centropus burchellii</i>			1
Cursorer, Bronze-winged	<i>Rhinoptilus chalcopterus</i>			1
Eagle, Black-chested Snake	<i>Circaetus pectoralis</i>			1
Eagle, Booted	<i>Hieraetus pennatus</i>			1
Firefinch, Jameson's	<i>Lagonosticta rhodopareia</i>			1
Harrier, Montagu's	<i>Circus pygargus</i>			1
Heron, Green-backed (Striated)	<i>Butorides striata</i>			1
Korhaan, Northern Black	<i>Afrotis afroides</i>			1
Korhaan, Red-crested	<i>Lophotis ruficrista</i>			1
Lark, Monotonous	<i>Mirafrapasserina</i>			1
Martin, Common House	<i>Delichon urbicum</i>			1
Myna, Common	<i>Acridotheres tristis</i>			1
Nightjar, European	<i>Caprimulgus europaeus</i>			1
Oriole, Eurasian Golden	<i>Oriolus oriolus</i>			1
Owl, Marsh	<i>Asio capensis</i>			1
Penduline-tit, Cape	<i>Anthoscopus minutus</i>			1
Pipit, Nicholson's	<i>Anthus similis</i>			1
Pytilia, Green-winged	<i>Pytilia melba</i>			1
Roller, Lilac-breasted	<i>Coracias caudatus</i>			1
Sunbird, Malachite	<i>Nectarinia famosa</i>			1
Sunbird, White-bellied	<i>Cinnyris talatala</i>			1
Swift, African Palm	<i>Cypsiurus parvus</i>			1
Swift, Bradfield's	<i>Apus bradfieldi</i>			1
Thrush, Short-toed Rock	<i>Monticola brevipes</i>			1
Warbler, Barred Wren-	<i>Calamonastes fasciolatus</i>			1
Whydah, Long-tailed Paradise	<i>Vidua paradisaea</i>			1
Wood-hoopoe, Green	<i>Phoeniculus purpureus</i>			1
Woodpecker, Cardinal	<i>Dendropicus fuscescens</i>			1

Appendix 3. Photographs of the site.









Appendix 4. GPS tracks from field survey of the site.



Heritage

**HERITAGE IMPACT ASSESSMENT:
PROPOSED 132KV/400KV ON-SITE MAIN TRANSMISSION
SUBSTATION (MTS) AND ASSOCIATED INFRASTRUCTURE
NEAR DEALESVILLE,
BOSHOF MAGISTERIAL DISTRICT, FREE STATE**

Required under Section 38(8) of the National Heritage Resources Act (No. 25 of 1999)
as part of a Heritage Impact Assessment.

Report for:

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On behalf of:

South Africa Mainstream Renewable Power Developments (Pty) Ltd



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1st draft: 12 October 2021
Final report: 09 November 2021

SUMMARY

ASHA Consulting (Pty) Ltd was appointed by SLR Consulting (South Africa) (Pty) Ltd to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed development of a Main Transmission Substation (MTS), Battery Energy Storage System (BESS), and associated powerlines just northwest of Dealesville, Free State. The northern and southern ends of the development are located at $S28^{\circ} 37' 54.5'' E25^{\circ} 43' 21.9''$ and $S28^{\circ} 40' 19.4'' E25^{\circ} 44' 05.4''$ respectively. The MTS and BESS would be located on the Remaining Extent of the Farm Klipfontein No. 305, while the powerlines would be on the Remaining Extent of the Farm Oxford 1030 and Farm Leliehoek 748.

The study area is comprised of relatively flat grasslands but with a gentle rise towards the south. The soil is dolerite-derived and small exposures of this rock were noted from time to time in the northern two-thirds of the development area. Stone artefacts dating to the Middle Stone Age were found to occur in some areas with one patch being of low-medium cultural significance and will require sampling. The cultural landscape was also identified as a heritage resource but its significance is low given the large amount of electrical infrastructure in the area. In addition, many other electrical facilities have already been authorised but not yet constructed. The proposed land use will thus not be out of place and the impact to the landscape is acceptable.

It is recommended that the proposed MTS, BESS and associated 132 kV and 400 kV powerlines should be approved but subject to the following recommendations:

- The archaeological materials located in the scatter at waypoints 286 to 289 should be sampled by an archaeologist prior to construction; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

Glossary

Acheulean (also Acheulian): An archaeological name for the period comprising the later part of the Early Stone Age. This period started about 1.7-1.5 million years ago and ended about 250-200 thousand years ago.

Background scatter: Artefacts whose spatial position is conditioned more by natural forces than by human agency.

Early Stone Age: Period of the Stone Age extending approximately between 2 million and 200 000 years ago.

Handaxe: A bifacially flaked, pointed stone tool type typical of the Early Stone Age Acheulian Industry. It is also referred to as a large cutting tool.

Holocene: The geological period spanning the last approximately 10-12 000 years.

Hominid: a group consisting of all modern and extinct great apes (i.e. gorillas, chimpanzees, orangutans and humans) and their ancestors.

Later Stone Age: Period of the Stone Age extending over the last approximately 20 000 years.

Middle Stone Age: Period of the Stone Age extending approximately between 200 000 and 20 000 years ago.

Pleistocene: The geological period beginning approximately 2.5 million years ago and preceding the Holocene.

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

BA: Basic Assessment

CRM: Cultural Resources Management

DEA&DP: Department of Environmental Affairs and Development Planning

DFFE: Department of Forestry, Fisheries and the Environment

EA: Environmental Authorisation

ECO: Environmental Control Officer

EGI: Electricity Grid Infrastructure

EIA: Environmental Impact Assessment

EMPr: Environmental Management Program

ESA: Early Stone Age

GP: General Protection

GPS: global positioning system

HIA: Heritage Impact Assessment

LCT: large cutting tool

LSA: Later Stone Age

MSA: Middle Stone Age

MTS: Main Transmission Substation

NBKB: Ngwao-Boswa Ya Kapa Bokoni

NEMA: National Environmental Management Act (No. 107 of 1998)

NHRA: National Heritage Resources Act (No. 25) of 1999

PPP: Public Participation Process

PV: Photo-voltaic

REDZ: Renewable Energy Development Zone

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

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1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by SLR Consulting (South Africa) (Pty) Ltd to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed development 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 (Figure 1). The northern and southern ends of the development are located at S28° 37' 54.5" E25° 43' 21.9" and S28° 40' 19.4" E25° 44' 05.4" respectively. The MTS and BESS would be located on the Remaining Extent of the Farm Klipfontein No. 305, while the powerlines would be on the Remaining Extent of the Farm Oxford 1030 and Farm Leliehoek 748.

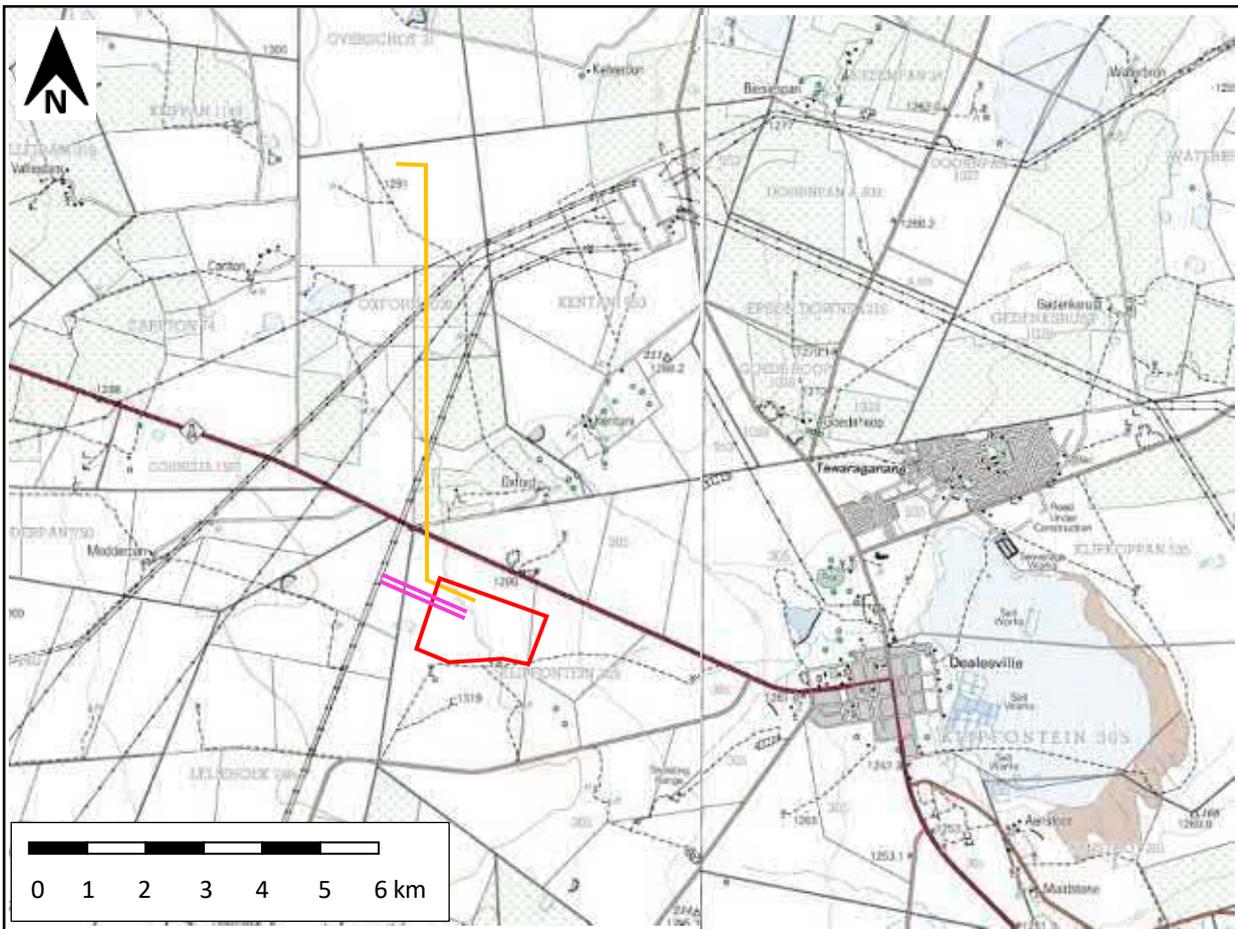


Figure 1: Extract from 1:50 000 topographic map 2825DA & 2825DB showing the location of the site relative to Dealesville. MTS site = red; powerlines = orange and pink. Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.

The proposed infrastructure is part of a larger solar energy development consisting of eleven photovoltaic facilities and associated infrastructure which have already been authorised. The newly proposed infrastructure is required to connect the eleven PV facilities to the national electricity grid and falls outside of the already authorised powerline corridor.

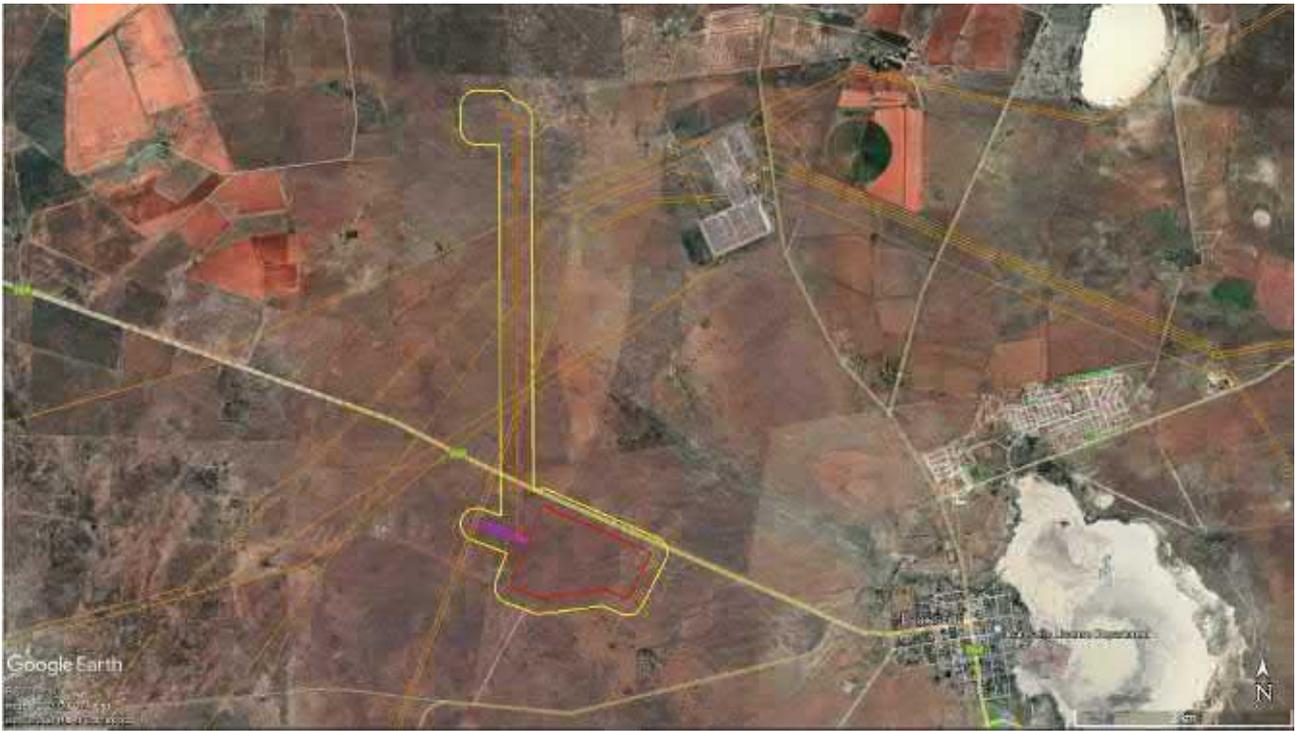


Figure 2: Aerial view of the development area and surrounds showing the landscape around the site with Dealesville to the southeast. MTS site = red; powerlines = orange and pink, development corridor = yellow.

1.1. The proposed project

1.1.1. Project description

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing to add one MTS, BESS and four powerlines to their authorised Kentani Cluster of solar photovoltaic (PV) developments near the town of Dealesville in the Free State Province. The proposed development will also involve the re-routing of eight already authorised 132 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.

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) (See Section 2.2.7 for explanation on the 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 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) will 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 not 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).

It is important to note that this 33 kV powerline is not a listed activity and therefore does not require authorisation. It is not reported on here. Because it does still trigger the National Heritage Resources Act (No. 25) of 1999 (NHRA) it will be reported on separately for the South African Heritage Resources Agency (SAHRA) to issue a decision.

A service road within 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.

As part of the BA process, powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the 400kV and 132kV powerlines. This is to allow flexibility when routing the powerlines within the authorised corridor.

1.1.2. Identification of alternatives

No alternative locations have been identified for the project since the infrastructure is required to support a suite of authorised solar energy facilities and other locations and technologies would not provide the required support. However, corridors have been assessed for the powerlines which allows micro-siting within the corridors should sensitive receptors be identified.

1.1.3. Aspects of the project relevant to the heritage study

All aspects of the proposed development are relevant, since excavations for foundations and/or services may impact on archaeological and/or palaeontological remains, while all above-ground aspects create potential visual (contextual) impacts to the cultural landscape and any significant heritage sites that might be visually sensitive.

1.2. Terms of reference

ASHA Consulting was provided with the following terms of reference for the study:

- Review the Department of Environment, Forestry and Fisheries (DFFE) online screening tool in order to assess the site sensitivity;
- Prepare a Site Sensitivity Verification and Impact Assessment Report in line with Appendix 6 of the 2014 EIA Regulations (as amended) and Heritage Authority Requirements for the Free State Province;
- Undertake a desktop study for initial data collection;
- Conduct a field survey for ground truthing and additional data collection; and
- Compile a report (including updates thereto) at BA level to comply with the latest regulations regarding specialist studies (i.e. site verification report and impact assessment report¹).

¹ GN 320 (20 March 2020): 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.

1.3. Scope and purpose of the report

A heritage impact assessment (HIA) is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This HIA report aims to fulfil the requirements of the heritage authorities such that a comment can be issued by them for consideration by the National Department of Forestry, Fisheries and Environment (DFFE) who will review the Basic Assessment (BA) and grant or refuse authorisation. The HIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation should this be granted.

1.4. The author

Dr Jayson Orton has an MA (UCT, 2004) and a D.Phil (Oxford, UK, 2013), both in archaeology, and has been conducting Heritage Impact Assessments and archaeological specialist studies in South Africa (primarily in the Western Cape and Northern Cape provinces) since 2004 (please see curriculum vitae included as Appendix 1). He has also conducted research on aspects of the Later Stone Age in these provinces and published widely on the topic. He is an accredited heritage practitioner with the Association of Professional Heritage Practitioners (APHP; Member #43) and also holds archaeological accreditation with the Association of Southern African Professional Archaeologists (ASAPA) CRM section (Member #233) as follows:

- Principal Investigator: Stone Age, Shell Middens & Grave Relocation; and
- Field Director: Colonial Period & Rock Art.

1.5. Declaration of independence

ASHA Consulting (Pty) Ltd and its consultants have no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided.

2. LEGISLATIVE CONTEXT

2.1. National Heritage Resources Act (NHRA) No. 25 of 1999

The NHRA protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: prehistoric and historical material (including ruins) more than 100 years old as well as military remains more than 75 years old, palaeontological material and meteorites;
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

Following Section 2, the definitions applicable to the above protections are as follows:

- Structures: “any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith”;

- Palaeontological material: “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”;
- Archaeological material: a) “material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures”; b) “rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation”; c) “wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation”; and d) “features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found”;
- Grave: “means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place”; and
- Public monuments and memorials: “all monuments and memorials a) “erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government”; or b) “which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual.”

Section 3(3) describes the types of cultural significance that a place or object might have in order to be considered part of the national estate. These are as follows:

- a) its importance in the community, or pattern of South Africa’s history;
- b) its possession of uncommon, rare or endangered aspects of South Africa’s natural or cultural heritage;
- c) its potential to yield information that will contribute to an understanding of South Africa’s natural or cultural heritage;
- d) its importance in demonstrating the principal characteristics of a particular class of South Africa’s natural or cultural places or objects;
- e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- i) sites of significance relating to the history of slavery in South Africa.

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list “historical settlements and townscapes” and “landscapes and natural features of cultural

significance” as part of the National Estate. Furthermore, some of the points in Section 3(3) speak directly to cultural landscapes.

Section 38(8) of the NHRA states that if an impact assessment is required under any legislation other than the NHRA then it must include a heritage component that satisfies the requirements of S.38(3). Furthermore, the comments of the relevant heritage authority must be sought and considered by the consenting authority prior to the issuing of a decision. Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to an BA. The present report provides the heritage component. Ngwao-Boswa Ya Kapa Bokoni (Heritage Northern Cape; for built environment and cultural landscapes) and SAHRA (for archaeology and palaeontology) are required to provide comment on the proposed project in order to facilitate final decision making by the DFFE.

3. METHODS

3.1. Literature survey and information sources

A survey of available literature was carried out to assess the general heritage context into which the development would be set. The information sources used in this report are presented in Table 1. Data were also collected via a field survey.

Table 1: Information sources used in this assessment.

Data / Information	Source	Date	Type	Description
Maps	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical and current 1:50 000 topographic maps of the study area and immediate surrounds
Aerial photographs	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical aerial photography of the study area and immediate surrounds
Aerial photographs	Google Earth	Various	Spatial	Recent and historical aerial photography of the study area and immediate surrounds
Cadastral data	Chief Directorate: National Geo-Spatial Information	Various	Survey diagrams	Historical and current survey diagrams, property survey and registration dates
Background data	South African Heritage Resources Information System (SAHRIS)	Various	Reports	Previous impact assessments for any developments in the vicinity of the study area
Palaeontological sensitivity	South African Heritage Resources Information System (SAHRIS)	Current	Spatial	Map showing palaeontological sensitivity and required actions based on the sensitivity.
Background data	Books, journals, websites	Various	Books, journals, websites	Historical and current literature describing the study area and any relevant aspects of cultural heritage.

3.2. Field survey

The site was subjected to a detailed foot survey on 2nd October 2021. This was during spring and before the onset of the rainy season. This meant that ground visibility for archaeological resources was about as good as it could get. Other heritage resources are not affected by seasonality. During the survey the positions of finds and survey tracks were recorded on a hand-held Global Positioning System (GPS) receiver set to the WGS84 datum (Figure 3). Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.

It should be noted that amount of time between the dates of the field inspection and final report do not materially affect the outcome of the report.

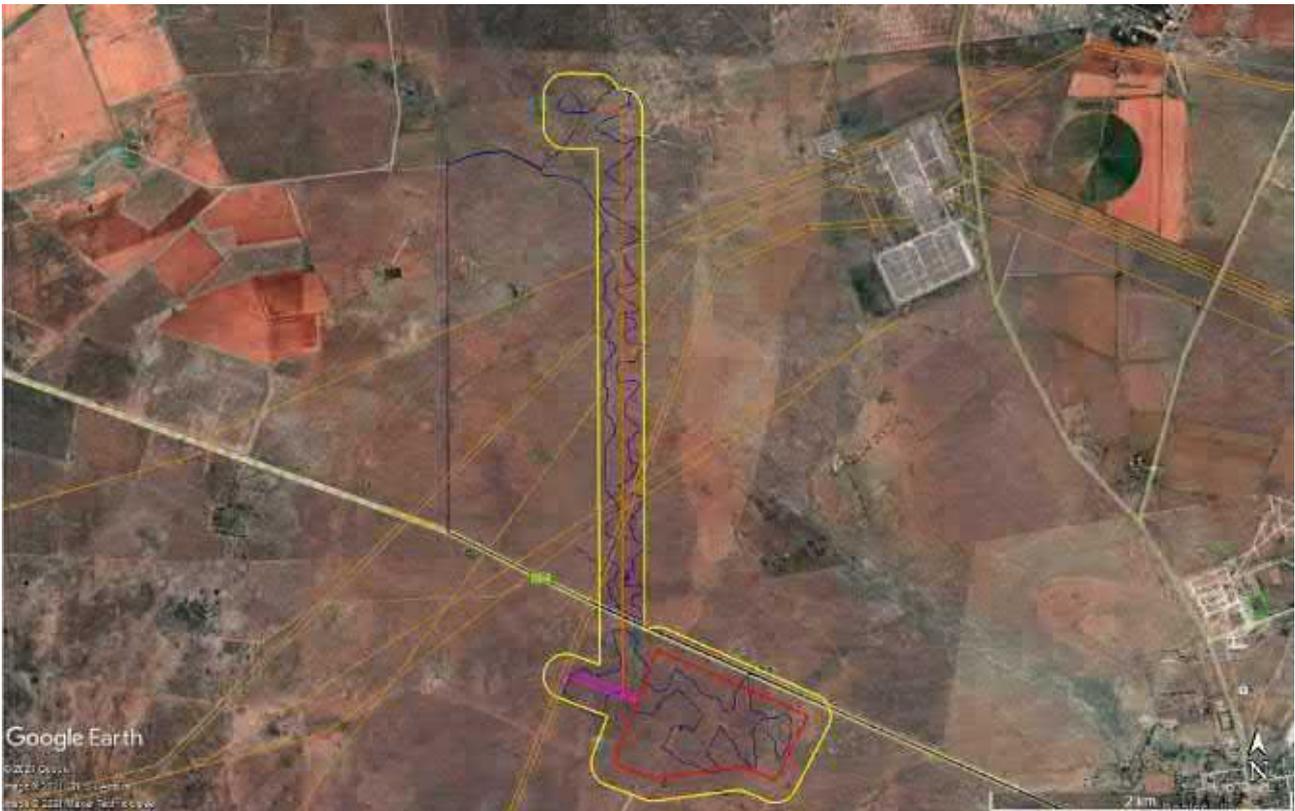


Figure 3: Aerial view of the development area (key as per Figure 2) showing the survey tracks (blue lines).

3.3. Specialist studies

No specialist studies were produced as part of this HIA, but a palaeontological specialist study was commissioned and will be submitted as a free-standing report (Butler 2021) to be read in conjunction with this HIA.

3.4. Impact assessment

For consistency among specialist studies, the impact assessment was conducted through application of a scale supplied by SLR.

3.5. Grading

S.7(1) of the NHRA provides for the grading of heritage resources into those of National (Grade I), Provincial (Grade II) and Local (Grade III) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade I and II resources are intended to be managed by the national and provincial heritage resources authorities respectively, while Grade III resources would be managed by the relevant local planning authority. These bodies are responsible for grading, but anyone may make recommendations for grading.

It is intended under S.7(2) that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance but this is generally yet to happen. SAHRA (2007) has formulated its own system² for use in provinces where it has commenting authority. In this system sites of high local significance are given Grade IIIA (with the implication that the site should be preserved in its entirety) and Grade IIIB (with the implication that part of the site could be mitigated and part preserved as appropriate) while sites of lesser significance are referred to as having 'General Protection' (GP) and rated as GP A (high/medium significance, requires mitigation), GP B (medium significance, requires recording) or GP C (low significance, requires no further action).

3.6. Consultation

The NHRA requires consultation as part of an HIA but, since the present study falls within the context of a BA, which includes a public participation process (PPP), no dedicated consultation was undertaken as part of the HIA. Interested and affected parties would have the opportunity to provide comment on the heritage aspects of the project during the PPP.

3.7. Assumptions and limitations

The field study was carried out at the surface only and hence any completely buried archaeological sites would not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. The grass cover over most of the site meant that visibility, although good at close range, was limited to within 2-3 m. The survey was based on the project layout provided before the fieldwork which means that later alterations may not be fully covered. It is assumed, however, that the observations made provide a good understanding of the distribution of heritage resources in the development area.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The development area is in a rural area dominated by the rearing of livestock, although some arable land is also present. The R64 which connects Dealesville and Boshof runs through the southern part of the development area with the proposed MTS being immediately south of the R64. Most visually prominent on the landscape, however, are the very large Eskom Perseus Substation which lies 3.5 km east of the northern part of the proposed powerline corridor (Figure 4) and the many existing high voltage powerlines (both 400 kV and 700 kV) that cross the proposed corridor. The

² The system is intended for use on archaeological and palaeontological sites only.

development area lies wholly within the Kimberley Renewable Energy Development Zone (REDZ) and within the Central Electricity Grid Infrastructure (EGI) corridor.



Figure 4: View towards the east from the development area showing the existing Eskom Perseus Substation and associated powerlines.

4.2. Site description

The site is comprised almost exclusively of grassland. The only exceptions are occasional small outcrops of dolerite and the R64 road. Aerial photography reveals that some areas have been ploughed in the recent past but there was absolutely no trace of this practice on the ground. The site slopes gently uphill towards the south, while the MTS site slopes downhill towards the east. Figures 5 to 13 show views of the development area. In the north the surface was exclusively sandy and animal burrows showed that below the surface was also sandy (Figure 14). Further south where gravel was seen animal burrows showed that the gravel was more dense just below the surface (Figure 15).



Figure 5: View towards the southeast through the northern end of the development area.



Figure 6: View towards the south directly along the proposed powerline corridor from its northern end. Puddles had formed on the very flat surface after recent rains.



Figure 7: View towards the north through the northern part of the proposed powerline corridor.



Figure 8: View towards the north through the central part of the proposed powerline corridor.



Figure 9: View towards the south through the southern part of the proposed powerline corridor.



Figure 10: View towards the northwest through the centre of the MTS site.



Figure 11: View towards the northeast through the MTS site from near its south-western corner.



Figure 12: View towards the southwest from the western edge of the MTS site showing a series of small dolerite boulders on the surface.



Figure 13: View towards the southwest from the point where the proposed powerline corridor crosses the R64.



Figure 14: An animal burrow showing no stone under the ground in the northern part of the development area.



Figure 15: A small excavation showing the presence of hornfels gravel beneath the surface.

5. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the development area during the course of the project. Please note that the palaeontological findings are presented in a separate specialist report (Butler 2021).

5.1. Archaeology

5.1.1. Desktop study

Stone Age material occurs widely across southern Africa, while the Iron Age, which only occurred within the last 2000 years, is present only in the eastern parts where summer rainfall allowed for

the cultivation of summer crops. Stone-walled settlements dating to the Iron Age have been widely documented in parts of the Free State and adjacent Northern Cape (Maggs 1976a, 1976b) but the Iron Age appears to be absent from the vicinity of Dealesville. Later Stone Age stone-built dwellings are known from along the Riet River about 100 km to the southwest (Humphreys 1972, 2009). With the exception of the rich MSA deposits of Florisbad (Kuman *et al.* 1999) and the MSA and LSA stone artefact assemblages from Erfkroon (Churchill *et al.* 2000), significant archaeological resources appear to be quite rare in this flat, open and well-grassed landscape. Archaeological material is, however, more common along the major rivers where artefacts are revealed in the river terrace gravels.

Webley (2010) surveyed an area to the southeast of the present development area and reported a complete absence of archaeological material. She further noted that stone suitable for the manufacture of flaked tools was not present and that the quantity of other rock available on the surface was insufficient to allow for the construction of stone dwellings. Hutten's (2011) survey of land to the north of Boshoff showed similar results but in that case a pan was present with a large scatter of MSA and LSA artefacts present alongside it. The same applied to a survey immediately west of the present development area where many thousands of artefacts were found adjacent to a pan (Orton 2016a). This demonstrates the preference to settle close to water sources that is prevalent across much of the relatively dry interior of southern Africa. Orton's (2015) survey of large areas surrounding and to the south of the present development area showed heritage resources to be quite common. They included built structures, artefact scatters and a number of rock engravings. The vast majority of resources were located in close proximity to the rock outcrop areas closer to Dealesville, while further south into the grasslands the archaeology dropped off significantly. The majority of artefacts located by Orton (2015) were attributable to Pleistocene-aged Middle Stone Age (MSA) background scatter and were associated with gravel exposures. They did not constitute *in situ* living sites. However, some artefacts dating to the Holocene Later Stone Age (LSA) were also noted. To the north of the present development area, Kaplan (2020, 2021) found similar artefacts ascribable to the MSA, with higher densities being present alongside pans.

Rock engravings occur widely in the interior of South Africa where suitable rock exists. Many sites are located in the Free State with the National Museum, Bloemfontein (2014) listing numerous examples that may be visited by the public. However, no sites seemed to be on record for the Dealesville area prior to Orton's (2015; see also Orton 2016b) survey. He located engravings dating within the last 2000 years and attributable by their geometric style to the Khoekhoe as well as figurative engravings done by the San. The former were found on a small dolerite hill 2 km west of the southern end of the present development area where flaked stone artefacts and ground patches on the dolerite were also recorded. Dolerite rocks with shallow grinding grooves and ground cupules have also been recorded in the area (Orton 2016a, b).

The remains of a historical stone-walled kraal also occur alongside the engraved outcrop described above (Orton 2015). Another stone-walled kraal and house ruin were recorded by Orton (2016a, b) to the west of the proposed MTS footprint, while Kaplan (2020) found stone-walled ruins to the north of the proposed powerline corridor.

5.1.2. Site visit

The northernmost 1.1 km of the proposed powerline corridor were found to be free of gravel and stone artefacts. However, from this point southwards, ephemeral gravel patches and occasional

stone artefacts attributable to background scatter were noted. The northernmost occurrence of gravel is indicated in Figure 16, along with all other recorded finds. A few background scatter finds are shown in Figure 17. An interesting observation was made within the MTS site. Here, an old excavation was found that showed the presence of a hornfels gravel lag deposit beneath the present soily surface (Figures 18 & 19). There were relatively few gravel clasts on the surface away from this excavation showing that their origin, at least in this area, is a buried layer beneath the surface. Very few artefacts were located within this area (Figure 19) suggesting that the density of artefacts within this gravel lag is low at this point. It is impossible to extend this prediction over a wider area because there are other factors (e.g. past hornfels gravel exposures) affecting artefact density that cannot be accounted for.

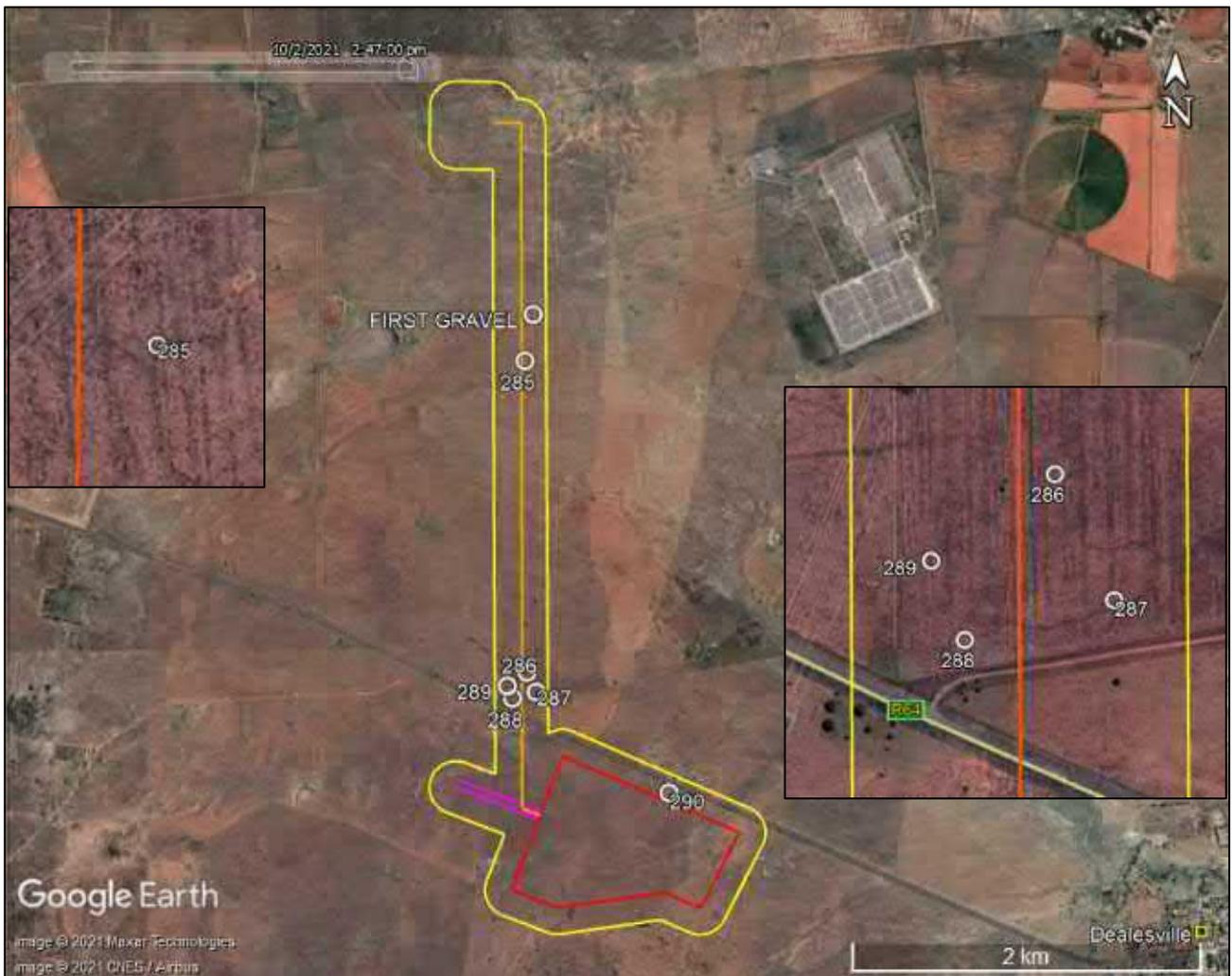


Figure 16: Aerial view of the development area showing the distribution of finds recorded during the survey. “First gravel” marks the place where the first clasts were seen while moving towards the south.

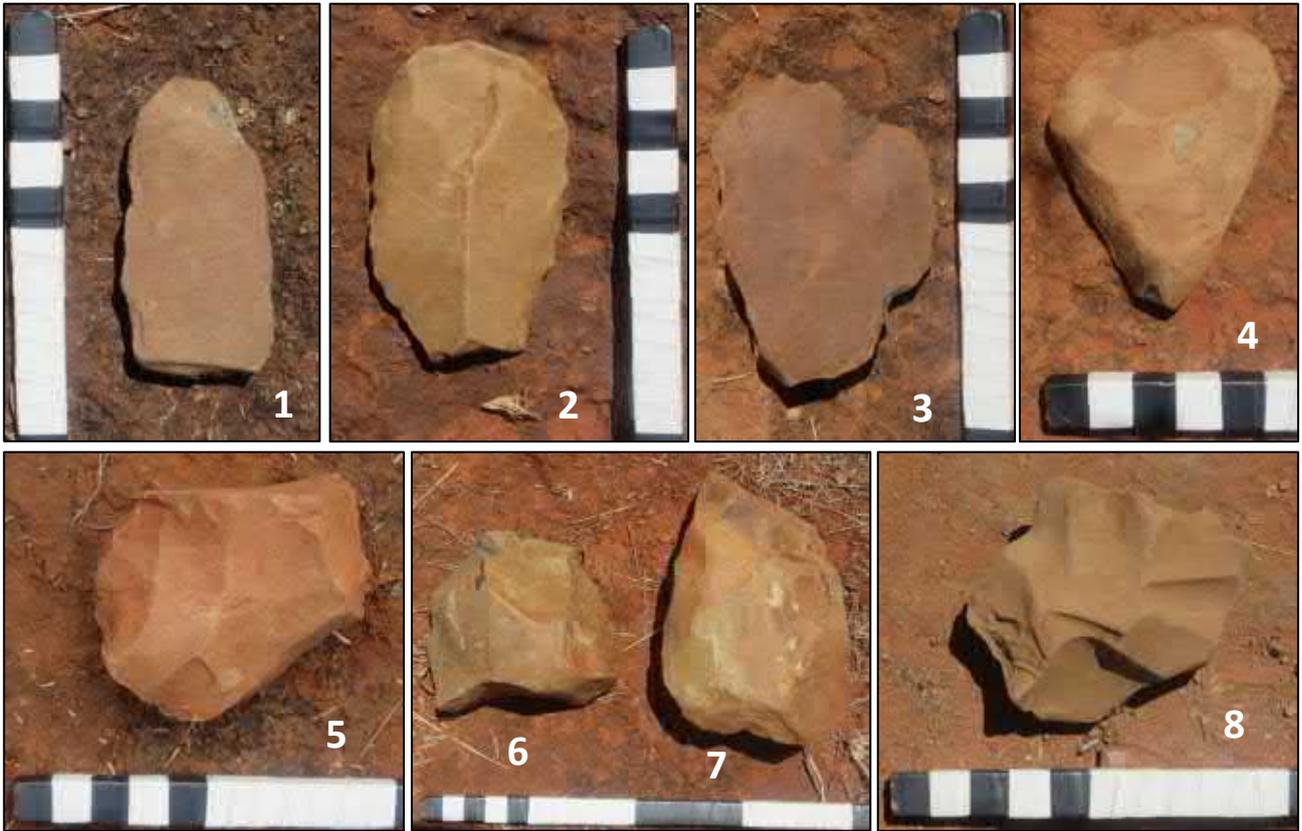


Figure 17: Selection of background scatter artefacts found during the survey. 1 = MSA proximal blade. 2 = MSA point with broken tip. 3 = flake. 4 = flake showing black hornfels in recent break at tip. 5, 6, 8 = cores. 7 = handaxe with broken tip.



Figure 18: View of the section of an excavation in the centre of the MTS site. A gravel lag deposit is evident beneath the surface (arrowed), while in the grassy area above there were minimal clasts present.



Figure 19: Close-up of the subsurface hornfels gravel lag deposit. Beneath the gravel is dolerite. Scale in 1 cm and 5 cm intervals.



Figure 20: Stone artefacts found in the gravels in the excavation. Scale in 1 cm and 5 cm intervals.

Five locations were recorded as Stone Age sites because they had sufficiently high artefact densities to not be purely the result of background scatter. While they do not reflect *in situ* living sites, it is likely that they were originally deposited in this area but have been redistributed by natural processes and ploughing over time. All were located in close proximity to the R64, four of them to its north within the powerline corridor and one of them to the south just outside of the MTS site (Figure 16). The four to the north are best regarded as points demarcating a single larger scatter of material. The locations and descriptions of these sites are provided in Table 2.

Table 2: List of sites recorded during the survey.

Waypoint	Location	Description	Significance (Grade)
285	S28 38 38.7 E25 43 28.8	A possible stone feature with 10 rocks that are almost submerged beneath the surface. A few other rocks are also present in the vicinity. The orientation of the rocks in approximately NE-SW. The location is within an old ploughed field. All these factors together suggest that the site is not a grave mound and can safely be ignored.	None
286	S28 39 36.0 E25 43 29.3	A large and quite widespread scatter of heavily weathered and patinated hornfels stone artefacts. The scatter includes flakes, blades, cores and bifacial artefacts. The artefacts are likely mostly MSA, but some ESA pieces are also present. The latter include a very large flake of about 19 cm and some bifacial artefacts.	Low-medium (GPB)
287	S28 39 39.6 E25 43 31.2	A scatter of heavily weathered and patinated hornfels stone artefacts including various flakes, blades and cores.	Low (GPC)
288	S28 39 40.8 E25 43 26.3	A scatter of heavily weathered and patinated hornfels stone artefacts including various flakes and blades.	Low (GPC)
289	S28 39 38.5 E25 43 25.2	A scatter of heavily weathered and patinated hornfels stone artefacts including various flakes and blades.	Low (GPC)
290	S28 39 58.3 E25 43 58.9	A scatter of heavily weathered and patinated hornfels stone artefacts including various flakes, blades and cores as well as one probable LCT.	Low (GPC)

The largest scatter was at waypoint 286 (Figure 21), although it is likely that the material at waypoint 286 to 289 simply reflects patches of a larger occurrence, since artefacts were present thinly throughout this area. At waypoint 286 a variety of flakes, blades, cores and some bifacial artefacts

were found. It is likely that all the bifacial pieces were handaxes (also known as large cutting tools [LCTs]) but breakage and weathering make a definitive ascription difficult. The small size of the bifacial artefacts (Figure 22 shows a distinctive one) may suggest an ascription to the so-called Fauresmith. Herries (2011:17) states that “LCTs are not distinctive only of the Acheulian and their persistence in some assemblages should not be used to equate them with the Acheulian but [should be seen] simply as a surviving ESA [Early Stone Age] element in an otherwise MSA assemblage.” This works well in the present context where the majority of diagnostic artefacts are clearly from the MSA. These include blades and points, although the characteristic faceted platforms are not visible due to the amount of surface weathering and patination present. In a general sense, many of the artefacts appear similar to those illustrated from Kanteen Kopje and ascribed there to the Fauresmith (Kuman *et al.* 2020).



Figure 21: Stone artefacts from waypoint 286. Scale in 1 cm and 5 cm intervals.



Figure 22: A small LCT from waypoint 286 showing both faces and both edges. Scale in 1 cm and 5 cm intervals.

Waypoints 287 to 289 showed similar artefacts but in smaller numbers and with fewer bifacial items. Figure 23 shows two artefacts from waypoint 287, while Figure 24 shows the ground surface at nearby waypoint 288 with flakes present amongst the surface gravel.



Figure 23: Two artefacts from waypoint 287. On the left is a very large flake with marks originating from being ploughed over and to the right is a small probable LCT. Scales in 1 cm and 5 cm intervals.



Figure 24: View of the surface at waypoint 288 with flakes and gravel clasts visible.

The last site was a scatter located further to the southeast at waypoint 290. This scatter was fairly similar in content to those described above but of lower density. Figure 25 shows a selection of finds from this scatter.



Figure 25: *Artefacts from waypoint 290. On the left is a probable LCT and some flakes and blades, while a core is shown to the right. Scale in 1 cm and 5 cm intervals.*

5.2. Graves

Orton (2015, 2016a, 2016b) has located several farm graveyards in the area as well as one isolated grave. No graves were seen during the present survey.

5.3. Historical aspects and the Built environment

5.3.1. Desktop study

Historical resources will be primarily associated with farmsteads, although most are likely to be fairly recent, perhaps dating to the late 19th or early 20th centuries. Several such resources – buildings, ruins and artefact scatters (the latter two both covered under archaeology) were located in the area by Orton (2015). The town of Dealesville is relatively recent, dating to 1899 (Raper n.d.). It was laid out on the farm Klipfontein belonging to John Henry Deale and was awarded municipal status in 1914.

The second Anglo-Boer War (1899-1902) played a significant role in South African History, particularly in the interior of the country. Many battles were fought between the British and Boer forces. Significant battles in proximity to the present development area include the Battles of Modder River and Magersfontein 100 km to the southwest and west respectively, the Battle of Paardeberg 60 km to the southwest and the Battle of Driefontein just outside Bloemfontein, some 60 km to the southeast. Graves, graveyards and memorials across the central interior of South Africa serve as reminders of the war.

5.3.2. Site visit

No historical sites were located in or close to the development area. The MTS would be located some 2.4 km west of the western edge of Dealesville. The town has few, if any, significant historical structures.

5.4. Cultural landscapes and scenic routes

The grasslands of the central interior of South Africa do have a particular character but this landscape type is very widespread and the Dealesville area is not special for any particular reason. In addition, it is noted that the landscape in and around the development area is visually very strongly dominated by electrical infrastructure. The R64 which links (from west to east) Kimberley, Boshof, Dealesville and Bloemfontein is the primary road traversing the area. The road is not a tourist route and, because it does not cross an especially scenic landscape, is not regarded as a scenic route of any significance.

5.5. Statement of significance and provisional grading

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

The archaeological resources are deemed to have up to low-medium cultural significance at the local level for their scientific value.

The cultural landscape is largely a rural landscape with minimal aesthetic value. It is of low cultural significance at the local level.

5.6. Summary of heritage indicators

Archaeological materials are non-renewable and easily disturbed heritage resources.

- Indicator: Significant archaeological materials should not be disturbed without appropriate study.

The landscape in this instance is dominated by electrical infrastructure. Nevertheless, new infrastructure provides further visual intrusion into the cultural landscape.

- Indicator: The proposed project should not dominate views from multiple directions.

6. ASSESSMENT OF IMPACTS

6.1. Impacts to archaeological resources

Archaeological resources may be damaged during the construction period when grubbing and/or excavations for foundations, roads and other infrastructure occurs. The impacts are direct and will occur during the construction phase only. Because of the limited cultural significance of the archaeological materials, the intensity is medium and the extent limited to the site. The calculated impact significance is **medium negative** before mitigation (Table 3). Mitigation is possible and easily effected through collection, recording and analysis of the stone artefacts. Only the larger scatter at waypoints 286 to 289 is suggested for mitigation. With mitigation the impact significance calculates to **low negative**. It should be noted that this is strongly influenced by the permanent duration of the impact and that a significance of very low negative would be more appropriate after mitigation. No

other management measures are required because once the mitigation is carried out there will be no further archaeological concerns. There are no fatal flaws in terms of archaeology.

Table 3: Assessment of archaeological impacts.

Issue	Destruction of archaeological resources	
Description of Impact		
Archaeological resources are damaged, destroyed or moved from their context.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Very Low
Duration	Permanent	Permanent
Extent	Site	Site
Consequence	Medium	Low
Probability	Probable	Unlikely / improbable
Significance	Medium -	Low -
Degree to which impact can be reversed	Low – archaeological resources are non-renewable and cannot be recreated on site.	
Degree to which impact may cause irreplaceable loss of resources	High - archaeological resources are non-renewable and irreplaceable.	
Degree to which impact can be mitigated	High – mitigation is easy to apply and will effectively capture archaeological data before development proceeds.	
Mitigation actions		
The following measures are recommended:	Recording and sampling of artefacts from the site (waypoints 286 to 289).	
Monitoring		
The following monitoring is recommended:	None.	
Cumulative impacts		
Nature of cumulative impacts	Direct	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Medium -	Very Low -

Given that the area where the archaeology occurs was previously ploughed, it is suggested that a large grid of squares measuring perhaps 3x3 m could be laid over the surface with all materials collected from these squares. A number of squares could then be selected for subsurface testing because ploughing would have distributed the material throughout the ploughzone. This mitigation work should preferably be carried out in the dry season in order to ensure efficient sieving of the soil and maximum recovery of finds.

6.2. Impacts to the cultural landscape

Impacts to the cultural landscape relate to the visual intrusion of the new electrical infrastructure into the rural cultural landscape. In this instance, however, it must be noted that a large amount of electrical infrastructure is already present in the landscape. This infrastructure includes many powerlines and two large substations, one of which lies close to the proposed development area.

As a result, the intensity of the new impact is rated as low. The impacts will occur for as long as the power line and substation remain present (i.e. long term). Because they will be visible from beyond the development area, the extent is rated as local. The position of the MTS alongside the R64 is notable in this instance because it will be very much in the public eye. During the construction and decommissioning phases the significance would be driven more by the amount of activity on site, while during operation it is driven mostly by the long-term duration of the impact. Before mitigation the impact significance is rated as being **medium negative** (Table 4). The proposed infrastructure cannot be meaningfully hidden and the landscape already has much similar infrastructure present. As such, only best practice measures related to minimising disturbance footprint and rehabilitating all areas not required during operation can be suggested. The impacts post-mitigation will remain **medium negative**. There are no fatal flaws in terms of the cultural landscape.

Table 4: Assessment of impacts to the cultural landscape.

Issue	Impacts to the cultural landscape	
Description of Impact		
Visual intrusion of electrical infrastructure into the rural cultural landscape.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction, Operation, Decommissioning	
Criteria	Without Mitigation	With Mitigation
Intensity	Low	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Definite / Continuous	Definite / Continuous
Significance	Medium -	Medium -
Degree to which impact can be reversed	High – With removal of all infrastructure and rehabilitation of the site, the current status quo could be recreated.	
Degree to which impact may cause irreplaceable loss of resources	Low – the grasslands of the South African interior are extensive and similar landscapes occur elsewhere.	
Degree to which impact can be mitigated	Low – There is nothing that can be done to hide the substation and powerlines.	
Mitigation actions		
The following measures are recommended:	Minimise disturbance footprint. Rehabilitate all areas not required during operation. Minimise size of access track.	
Monitoring		
The following monitoring is recommended:	None	
Cumulative impacts		
Nature of cumulative impacts	Direct	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Low -	Low -

6.3. Cumulative impacts

Cumulative impacts occur through the implementation of many developments in the surrounding area. This assessment includes all approved electrical facilities within a 30 km radius of the project site (Figure 26).

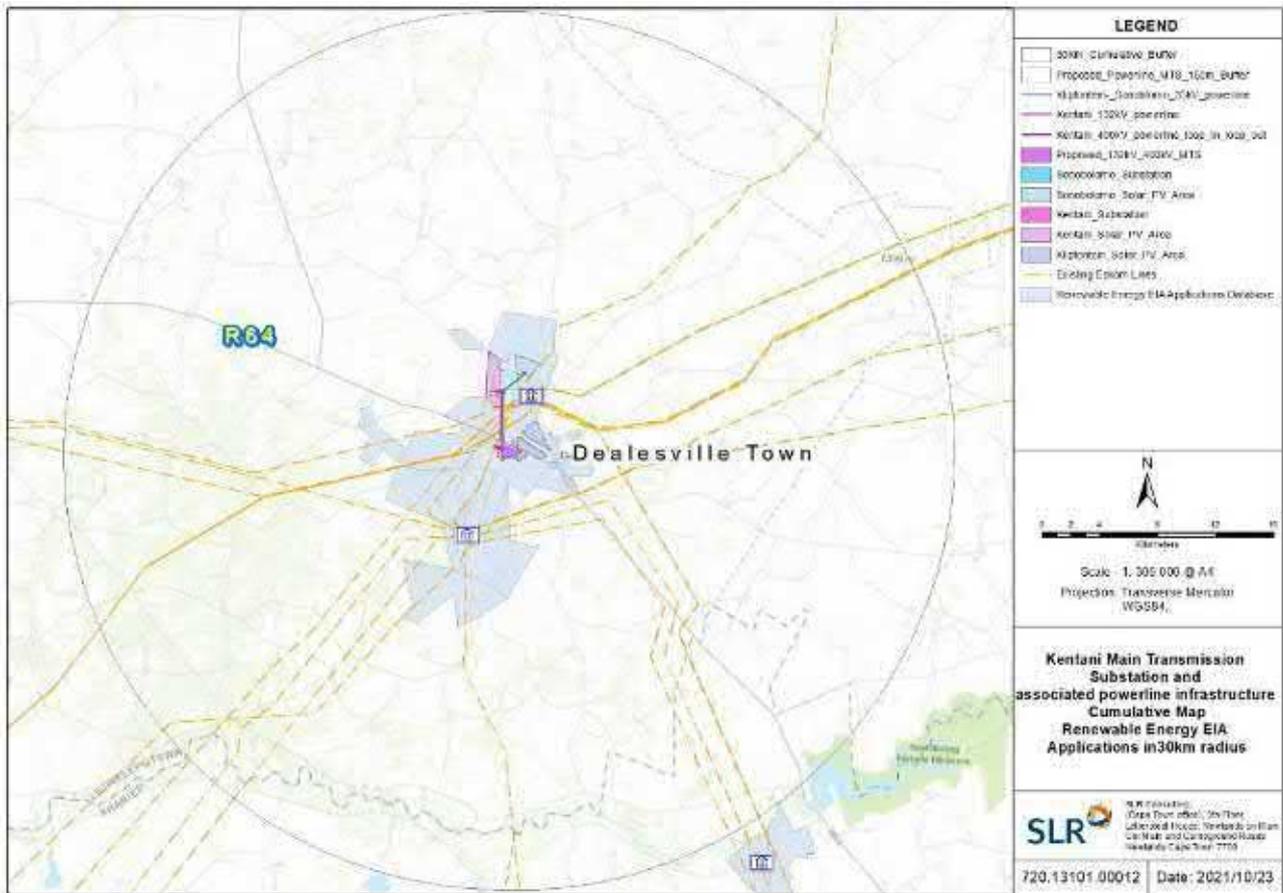


Figure 26: Map showing the locations of other electrical infrastructure applications in the area.

6.4. Evaluation of impacts relative to sustainable social and economic benefits

Section 38(3)(d) of the NHRA requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development.

The proposed project is intended to support eleven solar energy facilities. These facilities will produce electricity for South Africa. With the country having a shortage of reliable electricity supply which leads to frequent load-shedding, any new generation capacity will be a benefit to society. Aside from this obvious benefit, the currently proposed project will provide jobs, especially during the construction phase. Given the relatively limited heritage impacts, these socio-economic benefits can be seen to outweigh the impacts.

6.5. Existing impacts to heritage resources

There are currently no obvious threats to heritage resources on the site aside from the natural degradation, weathering and erosion that will affect the archaeological materials. Trampling from

grazing animals and/or farm/other vehicles could also occur. These impacts would be of **negligible negative** significance. The cultural landscape has already been affected by electrical development through the construction of substations and many powerlines. This existing impact is considered to be of **medium negative** significance.

6.6. The No-Go alternative

If the project were not implemented then the site would stay as it currently is. Although the heritage impacts with implementation would be greater than the existing impacts (specifically the archaeological impacts), the loss of socio-economic benefits through not being able to connect the eleven solar energy facilities to the national grid is more significant and suggests that the No-Go option is less desirable.

6.7. Levels of acceptable change

Any impact to an archaeological or palaeontological resource or a grave is deemed unacceptable until such time as the resource has been inspected and studied further if necessary. Impacts to the landscape are difficult to quantify but in general a development that visually dominates the landscape from many vantage points is undesirable. Although the presently proposed substation would dominate views along the R64, it would be seen in the context of many existing powerlines. While its placement immediately alongside the road is perhaps unfortunate, the existing infrastructure will help the new substation fit in and makes it more acceptable.

7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAM

The actions recorded in Table 5 should be included in the environmental management program (EMPr) for the project.

Table 5: Heritage considerations for inclusion in the EMPr.

Impact	Mitigation / management objectives & outcomes	Mitigation / management actions	Monitoring		
			Methodology	Frequency	Responsibility
Impacts to archaeology and graves					
Damage or destruction of archaeological sites	Avoid impacts (preferred) or sample sites before disturbance	Pre-construction mitigation	Appoint archaeologist to conduct mitigation well before construction	Once-off	Project developer
Damage or destruction of archaeological sites or graves	Rescue information, artefacts or burials before extensive damage occurs	Reporting chance finds as early as possible, protect <i>in situ</i> and stop work in immediate area	Inform staff and carry out inspections of excavations	Ongoing basis	Construction Manager or Contractor
				Whenever on site (at least weekly)	ECO
Impacts to the cultural landscape					
	Minimise landscape scarring	Ensure disturbance is kept to a minimum	Monitoring of surface clearance	Ongoing basis	Construction Manager or Contractor

Visible landscape scarring		and does not exceed project requirements. Rehabilitate areas not needed during operation.	relative to approved layout	As required	ECO
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8. CONCLUSIONS

The only heritage issues for this project are the destruction of archaeological materials and the visual intrusion of the infrastructure into the cultural landscape. However, neither of them is a significant concern for the approval of the project because the archaeology can very easily be mitigated, while the landscape is now largely an electrical landscape and, in conjunction with all the other existing and approved (but not yet constructed) electrical facilities in the immediate area, the new substation and powerline would not be overly out of place. A location for the substation somewhat further from the R64 would have been better, but it is understood that many other engineering and design considerations went into the location decision. Table 6 lists the heritage indicators and shows how they are met.

Table 6: Heritage indicators and project responses.

Indicator	Project Response
Significant archaeological materials should not be disturbed without appropriate study.	Archaeological mitigation has been suggested to meet this indicator.
The proposed project should not dominate views from multiple directions.	On its own the substation would dominate views along the R64 but it must be understood that it will not be constructed without the eleven authorised solar energy facilities which it is intended to support.

Since the 132 kV powerline route and associated access track goes right through the middle of the Stone Age artefact scatter, buffering the area is not possible. It is also possible that other archaeological materials will be present beneath the surface in other parts of the development area but sampling this scatter will provide a good representative sample of the type of materials present in the vicinity. Note that a permit application must be submitted to SAHRA by the appointed archaeologist in order to conduct the work. The purpose of this application is to ensure that an appropriately experienced archaeologist will do the work and that an appropriate methodology has been proposed.

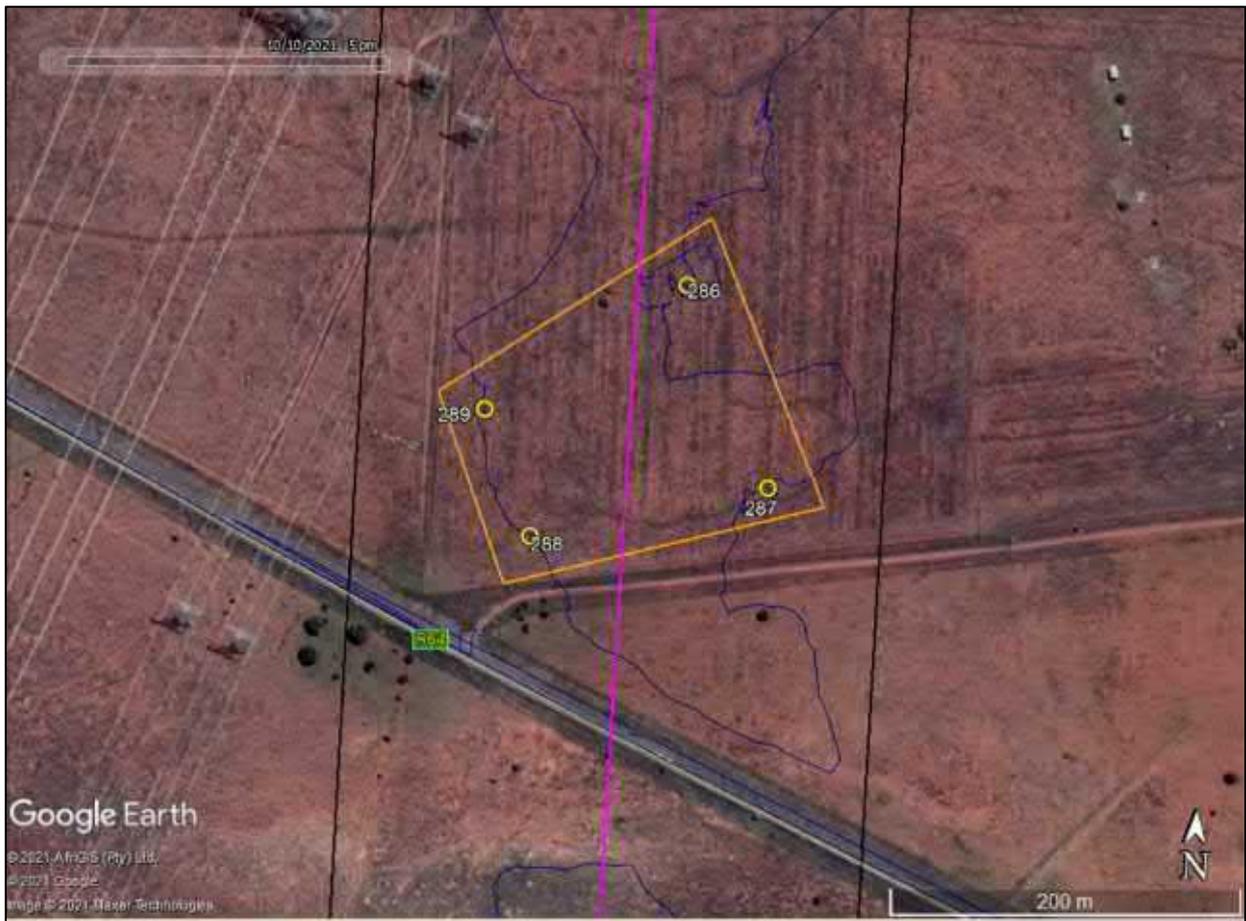


Figure 26: Aerial view showing the four waypoints making up the larger scatter considered to be of low-medium cultural significance (orange polygon).

8.1. Reasoned opinion of the specialist

Given that the archaeological material located within the development area is of low-medium cultural significance and the impacts can be easily mitigated, and that the landscape is essentially an electrical one in which the proposed new infrastructure would not be out of place, it is the opinion of the heritage specialist that the proposed project should be authorised in full.

9. RECOMMENDATIONS

It is recommended that the proposed substation and associated 132 kV and 400 kV powerlines should be approved but subject to the following recommendations:

- The archaeological materials located in the scatter at waypoints 286 to 289 should be sampled by an archaeologist prior to construction; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

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APPENDIX 1 – Curriculum Vitae



Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 23 Dover Road, Muizenberg, 7945
Telephone: (021) 788 1025
Cell Phone: 083 272 3225
Email: jayson@asha-consulting.co.za

Birth date and place: 22 June 1976, Cape Town, South Africa
Citizenship: South African
ID no: 760622 522 4085
Driver's License: Code 08
Marital Status: Married to Carol Orton
Languages spoken: English and Afrikaans

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science) 1997	
University of Cape Town	B.A. (Honours) (Archaeology)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Professional Accreditation:

Association of Southern African Professional Archaeologists (ASAPA) membership number: 233

CRM Section member with the following accreditation:

- Principal Investigator: Coastal shell middens (awarded 2007)
Stone Age archaeology (awarded 2007)
Grave relocation (awarded 2014)
- Field Director: Rock art (awarded 2007)
Colonial period archaeology (awarded 2007)

Association of Professional Heritage Practitioners (APHP) membership number: 43

- Accredited Professional Heritage Practitioner

➤ **Memberships and affiliations:**

South African Archaeological Society Council member	2004 – 2016
Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
UCT Department of Archaeology Research Associate	2013 –
Heritage Western Cape APM Committee member	2013 –
UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
Fish Hoek Valley Historical Association	2014 –
Kalk Bay Historical Association	2016 –
Association of Professional Heritage Practitioners member	2016 –

Fieldwork and project experience:

Extensive fieldwork and experience as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

Feasibility studies:

- Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- Project types
 - Notification of Intent to Develop applications (for Heritage Western Cape)
 - Desktop-based Letter of Exemption (for the South African Heritage Resources Agency)
 - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
 - Archaeological specialist studies
 - Phase 1 archaeological test excavations in historical and prehistoric sites
 - Archaeological research projects
- Development types
 - Mining and borrow pits
 - Roads (new and upgrades)
 - Residential, commercial and industrial development
 - Dams and pipe lines
 - Power lines and substations
 - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

Phase 2 mitigation and research excavations:

- ESA open sites
 - Duinefontein, Gouda, Namaqualand
- MSA rock shelters
 - Fish Hoek, Yzerfontein, Cederberg, Namaqualand
- MSA open sites
 - Swartland, Bushmanland, Namaqualand
- LSA rock shelters
 - Cederberg, Namaqualand, Bushmanland
- LSA open sites (inland)
 - Swartland, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
 - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
 - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
 - Franschhoek (farmstead and well), Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
- Historic burial grounds
 - Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl

Awards:

Western Cape Government Cultural Affairs Awards 2015/2016: Best Heritage Project.

APPENDIX 2 – Site Sensitivity Verification

A site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area. The details of the site sensitivity verification are noted below:

Date of Site Visit	02 October 2021
Specialist Name	Dr Jayson Orton
Professional Registration Number	ASAPA: 233; APHP: 043
Specialist Affiliation / Company	ASHA Consulting (Pty) Ltd

- Provide a description on how the site sensitivity verification was undertaken using the following means:

- (a) desk top analysis, using satellite imagery;
- (b) preliminary on -site inspection; and
- (c) any other available and relevant information.

Initial work was carried out using satellite aerial photography in combination with the author's accumulated knowledge of the local landscape. This was used to determine whether any areas were potentially sensitive and should be targeted during fieldwork. No specific sensitive areas were identified, but it was known from previous experience that artefacts were more likely to be found on the high ground in the south. Subsequent fieldwork served to ground truth the site. Desktop research was also used to inform on the heritage context of the area. This information is presented in the report (Sections 5.1.1 and 5.1.1).

- Provide a description of the outcome of the site sensitivity verification in order to:

- (a) confirm or dispute the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.; and
- (b) include a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity.

The maps in Figures A2.1 and A2.2 are extracted from the screening tool reports and show the archaeological and heritage sensitivity to be low. The site visit confirmed that in fact the majority of the site is of low sensitivity with only one small pocket (where archaeological resources were found) considered to be of medium sensitivity. Figure A2.3 shows the area considered to be archaeologically sensitive. Since the site was not of high cultural significance, it can be considered as a medium sensitivity area. A photographic record and description of the relevant heritage resource is contained within the impact assessment report. Briefly, the site contains Middle Stone Age (MSA) artefacts that include small bifacial tools likely ascribable to the Fauresmith period which is considered to represent the earliest MSA.

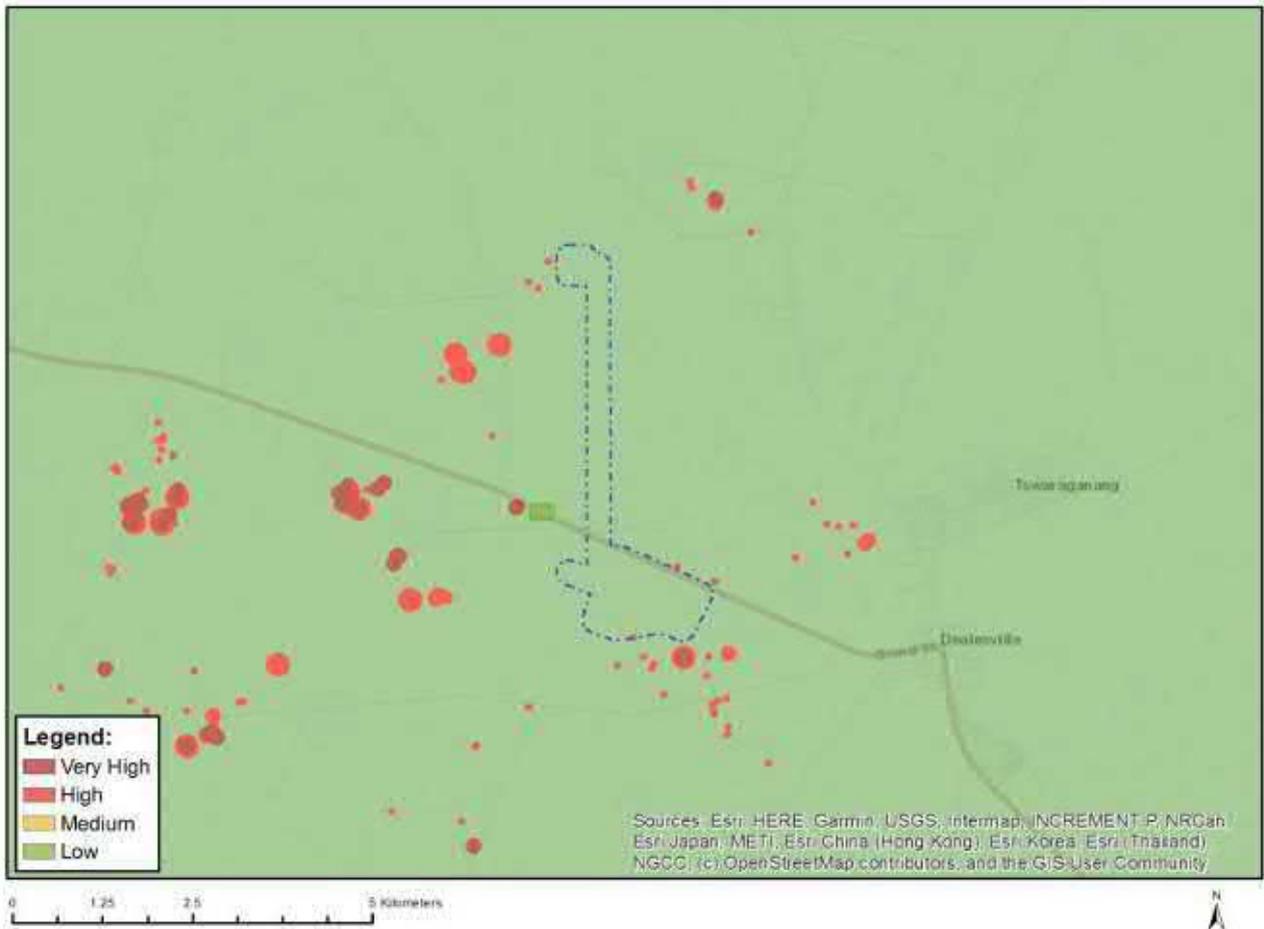


Figure A2.1: Screening tool map showing the powerline development area (blue dashed polygon) to be of low sensitivity (green shading).

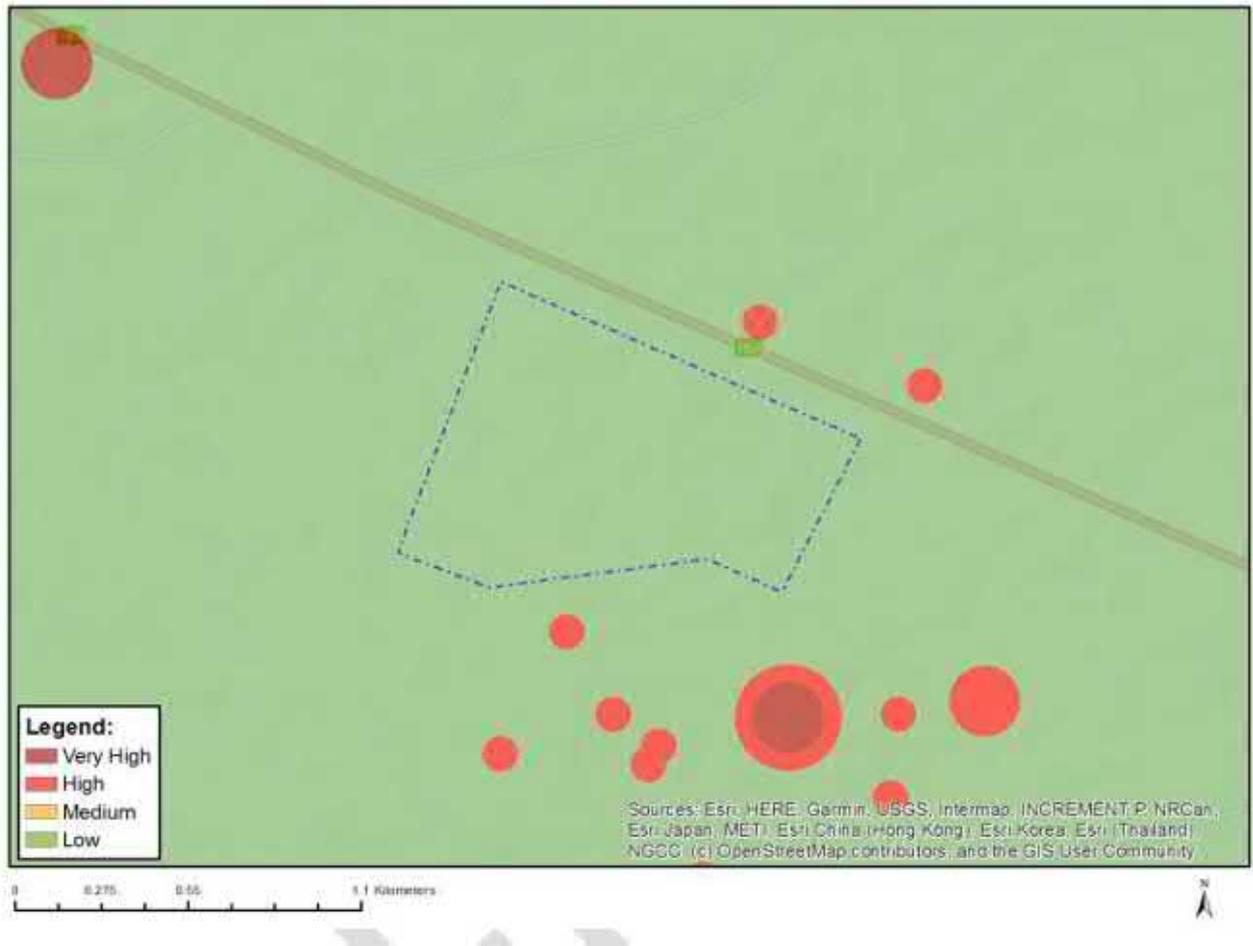


Figure A2.1: Screening tool map showing the MTS development area (blue dashed polygon) to be of low sensitivity (green shading).



Figure A2.3: Aerial view of the development area (black polygon) and proposed project (blue, purple and red) showing the single area of medium sensitivity (orange polygon).

APPENDIX 3 – Specialist Declaration



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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

File Reference Number:	(For official use only)
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

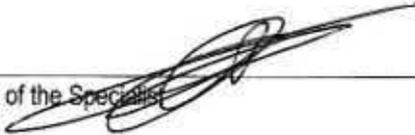
1. SPECIALIST INFORMATION

Specialist Company Name:	ASHA Consulting (Pty) Ltd		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			0
Specialist name:	Dr Jayson Orton		
Specialist Qualifications:	D.Phil (Archaeology, Oxford, UK) MA (Archaeology, UCT)		
Professional affiliation/registration:	ASAPA CRM member No. 233 APHP member No. 043		
Physical address:	23 Dover Road, Muizenberg, 7945		
Postal address:	23 Dover Road, Muizenberg		
Postal code:	7945	Cell:	083 272 3225
Telephone:	021 788 1025	Fax:	n/a
E-mail:	jayson@asha-consulting.co.za		

2. DECLARATION BY THE SPECIALIST

I, JAYSON ORTON 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 

Name of Company: ASHA CONSULTING (PTY) LTD

Date: 18-10-2021

Details of Specialist, Declaration and Undertaking Under Oath

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, JAYSON ORTON, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist



Name of Company

ASHA CONSULTING (PTY) LTD.

Date

18-10-2021

Signature of the Commissioner of Oaths

2197234/6
N.B. STRAUSS



Date

2021.10.18



HERITAGE IMPACT ASSESSMENT: PROPOSED 33 kV POWERLINE NEAR DEALESVILLE, BOSHOF MAGISTERIAL DISTRICT, FREE STATE

Required under Section 38(8) of the National Heritage Resources Act (No. 25 of 1999)
as part of a Heritage Impact Assessment.

Report for:

SLR Consulting (South Africa) (Pty) Ltd
1 Old Main Road, Kloof, Durban, 3640
Email: lscottshaw@slrconsulting.com

On behalf of:

South Africa Mainstream Renewable Power Developments (Pty) Ltd



Dr Jayson Orton
ASHA Consulting (Pty) Ltd
23 Dover Road, Muizenberg, 7945
Tel: (021) 788 1025 | 083 272 3225
Email: jayson@asha-consulting.co.za

16 October 2021

SUMMARY

ASHA Consulting (Pty) Ltd was appointed by SLR Consulting (South Africa) (Pty) Ltd to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed development of a 33 kV powerline just northwest of Dealesville, Free State. The north-eastern and south-western ends of the development are located at S28° 37' 13.5" E25° 44' 17.7" and S28° 37' 54.6" E25° 43' 21.8" respectively. The powerline would be located on the Remaining Extent of the Farm Walkerville 1031, Portion 1 of Walkerville 1031, Farm Overshot 31 and the Remaining Extent of the Farm Oxford 1030.

The study area is comprised of flat grasslands. Stone artefacts dating to the Middle Stone Age are known from the area and can be expected in very low densities throughout the area. The cultural landscape was also identified as a heritage resource but its significance is low given the large amount of electrical infrastructure in the area. In addition, many other electrical facilities have already been authorised but not yet constructed. The proposed land use will thus not be out of place and the impact to the landscape is acceptable.

It is recommended that the proposed 33 kV powerline should be approved but subject to the following recommendation:

- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

Glossary

Acheulean (also Acheulian): An archaeological name for the period comprising the later part of the Early Stone Age. This period started about 1.7-1.5 million years ago and ended about 250-200 thousand years ago.

Background scatter: Artefacts whose spatial position is conditioned more by natural forces than by human agency.

Early Stone Age: Period of the Stone Age extending approximately between 2 million and 200 000 years ago.

Handaxe: A bifacially flaked, pointed stone tool type typical of the Early Stone Age Acheulian Industry. It is also referred to as a large cutting tool.

Holocene: The geological period spanning the last approximately 10-12 000 years.

Hominid: a group consisting of all modern and extinct great apes (i.e. gorillas, chimpanzees, orangutans and humans) and their ancestors.

Later Stone Age: Period of the Stone Age extending over the last approximately 20 000 years.

Middle Stone Age: Period of the Stone Age extending approximately between 200 000 and 20 000 years ago.

Pleistocene: The geological period beginning approximately 2.5 million years ago and preceding the Holocene.

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

BA: Basic Assessment

CRM: Cultural Resources Management

DEA&DP: Department of Environmental Affairs and Development Planning

DFFE: Department of Forestry, Fisheries and the Environment

EA: Environmental Authorisation

ECO: Environmental Control Officer

EGI: Electricity Grid Infrastructure

EIA: Environmental Impact Assessment

EMPr: Environmental Management Program

ESA: Early Stone Age

GP: General Protection

GPS: global positioning system

HIA: Heritage Impact Assessment

LCT: large cutting tool

LSA: Later Stone Age

MSA: Middle Stone Age

MTS: Main Transmission Substation

NBKB: Ngwao-Boswa Ya Kapa Bokoni

NEMA: National Environmental Management Act (No. 107 of 1998)

NHRA: National Heritage Resources Act (No. 25) of 1999

PPP: Public Participation Process

PV: Photo-voltaic

REDZ: Renewable Energy Development Zone

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

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1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by SLR Consulting (South Africa) (Pty) Ltd to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed development of a 33 kV powerline just northwest of Dealesville, Free State (Figure 1). The north-eastern and south-western ends of the development are located at $S28^{\circ} 37' 13.5'' E25^{\circ} 44' 17.7''$ and $S28^{\circ} 37' 54.6'' E25^{\circ} 43' 21.8''$ respectively. From northeast to southwest, the powerline would be located on the Remaining Extent of the Farm Walkerville 1031, Portion 1 of Walkerville 1031, Farm Overshot 31 and the Remaining Extent of the Farm Oxford 1030.

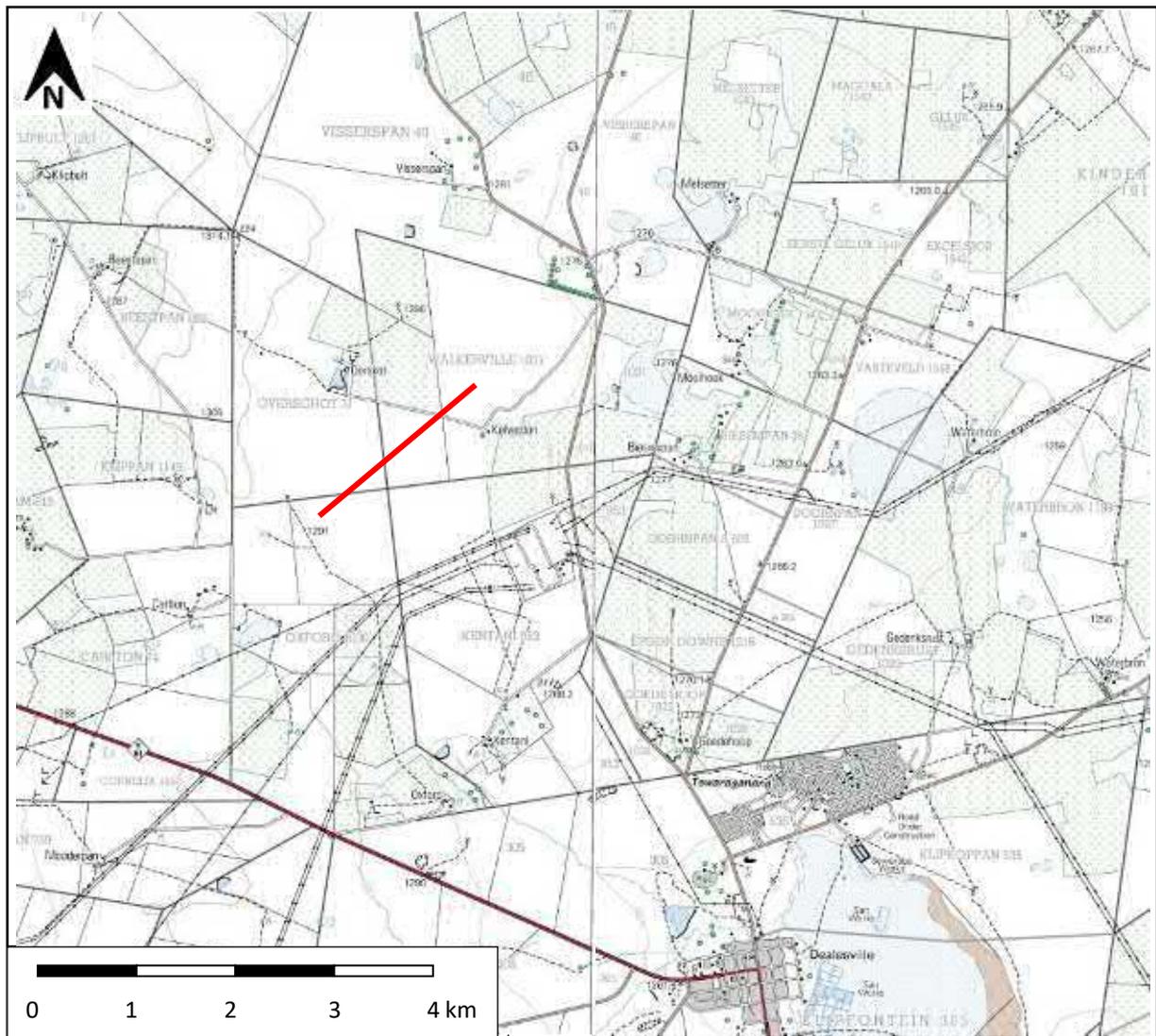


Figure 1: Extract from 1:50 000 topographic map 2825DA & 2825DB showing the location of the proposed powerline (red line) relative to Dealesville. Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.

The proposed infrastructure is part of a larger solar energy development consisting of eleven photovoltaic facilities and associated infrastructure which have already been authorised. The newly proposed infrastructure is required to connect the Sonoblomo PV facility to the Kentani PV facility substation, thereby facilitating the former's connection to the national electricity grid.



Figure 2: Aerial view of the development area and surrounds showing the landscape around the site (red line) with Dealesville to the southeast.

1.1. The proposed project

1.1.1. Project description

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing to add one MTS, a Battery Energy Storage System (BESS) and four powerlines to their authorised Kentani Cluster of solar photovoltaic (PV) developments near the town of Dealesville in the Free State Province. The proposed development will also involve the re-routing of eight already authorised 132 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. A Basic Assessment (BA) Process is being followed for this proposed development. However, one of the four powerlines does not constitute a listed activity under the National Environmental Management Act (No. 107 of 1998; NEMA) and was therefore not included in the terms of reference for the BA. Being longer than 300 m, it does still trigger the provisions of S.38(1) of the National Heritage Resources Act No. 25 of 1999 (NHRA) and the present report thus assesses the potential heritage Impacts from this powerline on its own.

The 33kv powerline (approx. 2km in length) will connect the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723) to the authorised Kentani on-site substation (14/12/16/3/3/2/724).

A service track within the servitude under the proposed powerline will also be required.

1.1.2. Identification of alternatives

No alternative locations have been identified for the project since the infrastructure is required to support one of a suite of authorised solar energy facilities and other locations and technologies would not provide the required support. However, the no-go alternative will be considered.

1.1.3. Aspects of the project relevant to the heritage study

All aspects of the proposed development are relevant, since excavations for foundations and/or services may impact on archaeological and/or palaeontological remains, while all above-ground aspects create potential visual (contextual) impacts to the cultural landscape and any significant heritage sites that might be visually sensitive.

1.2. Terms of reference

ASHA Consulting was provided with the following terms of reference for the study:

- Compile a desktop heritage impact assessment (HIA) that would meet the requirements of the National Heritage Resources Act (No. 25 of 1999) (NHRA).
- Consider all relevant aspects of heritage including archaeology, graves and the cultural landscape. (Palaeontology was to be covered by a separate specialist.)

1.3. Scope and purpose of the report

An HIA is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This HIA report aims to fulfil the requirements of the heritage authorities such that a decision can be issued by them. The HIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of approval.

1.4. The author

Dr Jayson Orton has an MA (UCT, 2004) and a D.Phil (Oxford, UK, 2013), both in archaeology, and has been conducting Heritage Impact Assessments and archaeological specialist studies in South Africa (primarily in the Western Cape and Northern Cape provinces) since 2004 (please see curriculum vitae included as Appendix 1). He has also conducted research on aspects of the Later Stone Age in these provinces and published widely on the topic. He is an accredited heritage practitioner with the Association of Professional Heritage Practitioners (APHP; Member #43) and also holds archaeological accreditation with the Association of Southern African Professional Archaeologists (ASAPA) CRM section (Member #233) as follows:

- Principal Investigator: Stone Age, Shell Middens & Grave Relocation; and
- Field Director: Colonial Period & Rock Art.

1.5. Declaration of independence

ASHA Consulting (Pty) Ltd and its consultants have no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided.

2. LEGISLATIVE CONTEXT

2.1. National Heritage Resources Act (NHRA) No. 25 of 1999

The NHRA protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: prehistoric and historical material (including ruins) more than 100 years old as well as military remains more than 75 years old, palaeontological material and meteorites;
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

Following Section 2, the definitions applicable to the above protections are as follows:

- Structures: “any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith”;
- Palaeontological material: “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”;
- Archaeological material: a) “material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures”; b) “rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation”; c) “wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation”; and d) “features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found”;
- Grave: “means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place”; and
- Public monuments and memorials: “all monuments and memorials a) “erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government”; or b) “which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual.”

Section 3(3) describes the types of cultural significance that a place or object might have in order to be considered part of the national estate. These are as follows:

- a) its importance in the community, or pattern of South Africa’s history;
- b) its possession of uncommon, rare or endangered aspects of South Africa’s natural or cultural heritage;
- c) its potential to yield information that will contribute to an understanding of South Africa’s natural or cultural heritage;
- d) its importance in demonstrating the principal characteristics of a particular class of South Africa’s natural or cultural places or objects;
- e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- i) sites of significance relating to the history of slavery in South Africa.

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list “historical settlements and townscapes” and “landscapes and natural features of cultural significance” as part of the National Estate. Furthermore, some of the points in Section 3(3) speak directly to cultural landscapes.

Section 38(1) of the NHRA provides categories of development that require submission of notification to the relevant heritage authorities where they are the consenting authority. Section 38 (2a) states that if there is reason to believe that heritage resources will be affected then an impact assessment report meeting the requirements of S38(3) must be submitted for decision-making. This report fulfils that requirement.

3. METHODS

3.1. Literature survey and information sources

A survey of available literature was carried out to assess the general heritage context into which the development would be set. The information sources used in this report are presented in Table 1. Data were also collected via a field survey.

Table 1: Information sources used in this assessment.

Data / Information	Source	Date	Type	Description
Maps	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical and current 1:50 000 topographic maps of the study area and immediate surrounds
Aerial photographs	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical aerial photography of the study area and immediate surrounds

Aerial photographs	Google Earth	Various	Spatial	Recent and historical aerial photography of the study area and immediate surrounds
Cadastral data	Chief Directorate: National Geo-Spatial Information	Various	Survey diagrams	Historical and current survey diagrams, property survey and registration dates
Background data	South African Heritage Resources Information System (SAHRIS)	Various	Reports	Previous impact assessments for any developments in the vicinity of the study area
Palaeontological sensitivity	South African Heritage Resources Information System (SAHRIS)	Current	Spatial	Map showing palaeontological sensitivity and required actions based on the sensitivity.
Background data	Books, journals, websites	Various	Books, journals, websites	Historical and current literature describing the study area and any relevant aspects of cultural heritage.

3.2. Field survey

The site was not specifically surveyed, although small parts of it have been covered by the present author during the course of other assessments. These other surveys were on 23rd August 2014 and 2nd October 2021. These were during winter and spring, before the onset of the rainy season. This meant that ground visibility for archaeological resources was good. Other heritage resources are not affected by seasonality. During the surveys the positions of finds and survey tracks were recorded on a hand-held Global Positioning System (GPS) receiver set to the WGS84 datum (Figure 3). Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.

It should be noted that amount of time between the dates of the field inspection and final report do not materially affect the outcome of the report.



Figure 3: Aerial view of the proposed powerline (red line) showing the survey tracks recorded during surveys for other projects (blue lines).

3.3. Specialist studies

No specialist studies were produced as part of this HIA, but a palaeontological specialist study was commissioned and will be submitted as a free-standing report (Butler 2021) to be read in conjunction with this HIA.

3.4. Impact assessment

The impact assessment was conducted through application of a scale supplied by SLR.

3.5. Grading

S.7(1) of the NHRA provides for the grading of heritage resources into those of National (Grade I), Provincial (Grade II) and Local (Grade III) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade I and II resources are intended to be managed by the national and provincial heritage resources authorities respectively, while Grade III resources would be managed by the relevant local planning authority. These bodies are responsible for grading, but anyone may make recommendations for grading.

It is intended under S.7(2) that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance but this is generally yet to happen. SAHRA (2007) has formulated its own system¹ for use in provinces where it has commenting authority. In this system sites of high local significance are given Grade IIIA (with the implication that the site should be preserved in its entirety) and Grade IIIB (with the implication that part of the site could be mitigated and part preserved as appropriate) while sites of lesser significance are referred to as having 'General Protection' (GP) and rated as GP A (high/medium significance, requires mitigation), GP B (medium significance, requires recording) or GP C (low significance, requires no further action).

3.6. Assumptions and limitations

The actual footprint was not examined in the field. The very limited quantity of archaeological materials known from the surrounding area and their low significance suggests that the chances of significant resources being present are extremely low. The previous studies were carried out at the surface only and hence any completely buried archaeological sites would not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. The grass cover over most of the site meant that visibility, although good at close range, was limited to within 2-3 m.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The development area is in a rural area dominated by the rearing of livestock, although some arable land is also present. The R64 which connects Dealesville and Boshof runs through the southern part of the development area with the proposed MTS being immediately south of the R64. Most visually

¹ The system is intended for use on archaeological and palaeontological sites only.

prominent on the landscape, however, are the very large Eskom Perseus Substation which lies 1.4 km southeast of the proposed powerline (Figure 4) and the many existing high voltage powerlines (both 400 kV and 700 kV) that enter and exit this substation to the south of the study area. The development area lies wholly within the Kimberley Renewable Energy Development Zone (REDZ) and within the Central Electricity Grid Infrastructure (EGI) corridor.



Figure 4: View towards the east from the south-western end of the proposed powerline showing the existing Eskom Perseus Substation and associated powerlines.

4.2. Site description

The site is comprised almost exclusively of grassland. Figures 5 to 8 show views of the development area. The surface is generally sandy with minimal gravel clasts.



Figure 5: View towards the southeast in the south-western end of the study area (23.10.2021).



Figure 6: View towards the south across the route of the proposed powerline in its south-western part. Puddles had formed on the very flat surface after recent rains (23.10.2021).



Figure 7: View towards the north looking towards the proposed powerline (23.10.2021).



Figure 8: View towards the north through the northern part of the proposed powerline alignment (23.08.2014).

5. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the development area during the course of the project. Please note that the palaeontological findings are presented in a separate specialist report (Butler 2021).

5.1. Archaeology

5.1.1. Desktop study

Stone Age material occurs widely across southern Africa, while the Iron Age, which only occurred within the last 2000 years, is present only in the eastern parts where summer rainfall allowed for the cultivation of summer crops. Stone-walled settlements dating to the Iron Age have been widely documented in parts of the Free State and adjacent Northern Cape (Maggs 1976a, 1976b) but the Iron Age appears to be absent from the vicinity of Dealesville. Later Stone Age stone-built dwellings are known from along the Riet River about 100 km to the southwest (Humphreys 1972, 2009). With the exception of the rich MSA deposits of Florisbad (Kuman *et al.* 1999) and the MSA and LSA stone artefact assemblages from Erfkroon (Churchill *et al.* 2000), significant archaeological resources appear to be quite rare in this flat, open and well-grassed landscape. Archaeological material is, however, more common along the major rivers where artefacts are revealed in the river terrace gravels.

Webley (2010) surveyed an area to the southeast of the present development area and reported a complete absence of archaeological material. She further noted that stone suitable for the manufacture of flaked tools was not present and that the quantity of other rock available on the surface was insufficient to allow for the construction of stone dwellings. Hutten's (2011) survey of land to the north of Boshoff showed similar results but in that case a pan was present with a large scatter of MSA and LSA artefacts present alongside it. The same applied to a survey immediately west of the present development area where many thousands of artefacts were found adjacent to a pan (Orton 2016a). This demonstrates the preference to settle close to water sources that is prevalent across much of the relatively dry interior of southern Africa. Orton's (2015) survey of large areas surrounding and to the south of the present development area showed heritage resources to be quite common. They included built structures, artefact scatters and a number of rock engravings. The vast majority of resources were located in close proximity to the rock outcrop areas closer to Dealesville, while further south into the grasslands the archaeology dropped off significantly. The majority of artefacts located by Orton (2015) were attributable to Pleistocene-aged Middle Stone Age (MSA) background scatter and were associated with gravel exposures. They did not constitute *in situ* living sites. However, some artefacts dating to the Holocene Later Stone Age (LSA) were also noted. To the north of the present development area, Kaplan (2020, 2021) found similar artefacts ascribable to the MSA, with higher densities being present alongside pans.

Rock engravings occur widely in the interior of South Africa where suitable rock exists. Many sites are located in the Free State with the National Museum, Bloemfontein (2014) listing numerous examples that may be visited by the public. However, no sites seemed to be on record for the Dealesville area prior to Orton's (2015; see also Orton 2016b) survey. He located engravings dating within the last 2000 years and attributable by their geometric style to the Khoekhoe as well as figurative engravings done by the San. The former were found on a small dolerite hill 2 km west of the southern end of the present development area where flaked stone artefacts and ground patches

on the dolerite were also recorded. Dolerite rocks with shallow grinding grooves and ground cupules have also been recorded in the area (Orton 2016a, b).

The remains of a historical stone-walled kraal also occur alongside the engraved outcrop described above (Orton 2015). Another stone-walled kraal and house ruin were recorded by Orton (2016a, b) to the west of the proposed MTS footprint, while Kaplan (2020) found stone-walled ruins to the north of the proposed powerline corridor.

5.1.2. Site visit

The two site visits that covered parts of the powerline did not locate any heritage materials within the footprint. It is clear from aerial photography that no landscape features like rocky hills or outcrops, or groves of trees (or any trees) occur within the proposed footprint and its immediate surrounds. Nevertheless, a few heritage resources are known from the wider area (within 1 km of the proposed footprint) and these are listed and described in Table 2. All are archaeological resources.

Table 2: List of sites recorded during the surveys within 1 km of the proposed powerline. Source: Orton (2015: Appendix 1).

Waypoint	Location	Description	Significance (Grade)
126	S28 37 28.8 E25 44 20.5	Ruined farmhouse of 11 m by 8 m with an external hearth and chimney stack, looks like it was Victorian. The external walls and chimney (which was a later addition) were made of red clay bricks with frogs, while other walls were made from locally manufactured sun-baked bricks made from local soil and organic matter. The house had six rooms. There is plaster rustication around the openings. Barbed wire has been built into the walls for strengthening. The kitchen has a cement floor but the rest of the house would have had a wooden floor. The house has stone foundations under every wall.	Medium (GPA) AVOID
127	S28 37 30.5 E25 44 20.5	Stone foundation with the remains of brick walls above. Structure was 6 m by 8 m. Floor is cement. There are frog bricks present.	
128	S28 37 24.4 E25 44 09.8	Old stock post, twentieth century artefacts present, but the site may have had its roots in the 19 th century. Most artefacts lying about are glass and metal, including parts of an old cast iron single bed.	Very low (GPC)
129	S28 37 21.8 E25 44 08.9	Stone foundation located some 70- 80 m south of the stock post area but probably related to it. Also some Coronation bricks here.	
173	S28 37 53.7 E25 43 05.3	Small dam with walls lined with packed dolerite cobbles and boulders.	Very low (GPC)
174	S28 38 04.4 E25 43 00.9	Scatter of MSA hornfels artefacts eroding out of a farm road.	Very low (GPC)
175	S28 38 01.8 E25 42 56.5	Scatter of MSA hornfels artefacts in a deflated area that has gravel present in it as well.	Very low (GPC)

Stone Age resources were seen in one area (waypoints 174 and 175) and comprised of background scatter artefacts of low density and low significance (Figure 10). Such finds have been widely recorded in the area.



Figure 9: Map showing the locations of finds.



Figure 10: Stone artefacts from waypoint 174.

All other records are of historical features. They include a small dam lined with dolerite cobbles (Figure 11), a ruined farm complex (Figures 12 to 14) and the ephemeral remains of a stock post (Figures 15 and 16). While the dam and stock post are of low significance, the house preserves a number of architectural details (see Table 2) and is of more concern. It is in very poor condition though, having been stripped of its joinery, presumably for reuse elsewhere. None of these finds will be impacted by the proposed powerline.



Figure 11: The small dolerite-lined dam at waypoint 173.



Figure 12: The setting of the farm complex at waypoints 126 and 127.



Figure 13: *The farmhouse ruin at waypoint 126.*



Figure 14: *Stone and brick foundations at waypoint 127.*



Figure 15: *Very low density artefact scatter at an old stock post at waypoint 128.*



Figure 16: *The ephemeral remains of a structure at waypoint 129.*

5.2. Graves

Orton (2015, 2016a, 2016b) has located several farm graveyards in the wider area as well as one isolated grave. No graves were seen during the survey in the present study area and none are expected to occur.

5.3. Historical aspects and the Built environment

5.3.1. Desktop study

Historical resources will be primarily associated with farmsteads, although most are likely to be fairly recent, perhaps dating to the late 19th or early 20th centuries. Several such resources – buildings, ruins and artefact scatters (the latter two both covered under archaeology with some having been described above) were located in the area by Orton (2015). The town of Dealesville is relatively recent, dating to 1899 (Raper n.d.). It was laid out on the farm Klipfontein belonging to John Henry Deale and was awarded municipal status in 1914.

The second Anglo-Boer War (1899-1902) played a significant role in South African History, particularly in the interior of the country. Many battles were fought between the British and Boer forces. Significant battles in proximity to the present development area include the Battles of Modder River and Magersfontein 100 km to the southwest and west respectively, the Battle of Paardeberg 60 km to the southwest and the Battle of Driefontein just outside Bloemfontein, some 60 km to the southeast. Graves, graveyards and memorials across the central interior of South Africa serve as reminders of the war.

5.3.2. Site visit

Aside from the archaeological materials already described, no historical sites were located in or close to the development area. Dealesville has few, if any, significant historical structures.

5.4. Cultural landscapes and scenic routes

The grasslands of the central interior of South Africa do have a particular character but this landscape type is very widespread and the Dealesville area is not special for any particular reason. In addition, it is noted that the landscape in and around the development area is visually very strongly dominated by electrical infrastructure. The R64 which links (from west to east) Kimberley, Boshof, Dealesville and Bloemfontein is the primary road traversing the area. The road is not a tourist route and, because it does not cross an especially scenic landscape, is not regarded as a scenic route of any significance.

5.5. Statement of significance and provisional grading

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

Although no significant archaeological resources are known from the study area and a dedicated survey has not been carried out, it is unlikely that anything other than background scatter might be present. Such material would be of no more than low cultural significance at the local level for its scientific value.

The cultural landscape is largely a rural landscape with minimal aesthetic value. It is of low cultural significance at the local level.

5.6. Summary of heritage indicators

Archaeological materials are non-renewable and easily disturbed heritage resources.

- Indicator: Significant archaeological materials should not be disturbed without appropriate study.

The landscape in this instance is dominated by electrical infrastructure. Nevertheless, new infrastructure provides further visual intrusion into the cultural landscape.

- Indicator: The proposed project should not dominate views from multiple directions.

6. ASSESSMENT OF IMPACTS

6.1. Impacts to archaeological resources

Archaeological resources may be damaged during the construction period when grubbing and/or excavations for powerline foundations and the adjoining access track occurs. None are known, but there is a high likelihood that a few background scatter artefacts will be present within the surface soil. The impacts are direct and will occur during the construction phase only. Because of the very low cultural significance of the archaeological materials, the intensity is very low and the extent limited to the site. The calculated impact significance is **low negative** before mitigation (Table 3). Mitigation is not suggested since no significant artefact scatters are known or likely to occur and the project footprint is very minor which will mean only minimal impacts. The post-mitigation impact significance thus remains **low negative**. It should be noted that the ratings are strongly influenced by the permanent duration of the impact and that a significance of very low negative would be more appropriate after mitigation. No other management measures are required and there are no fatal flaws in terms of archaeology.

Table 3: Assessment of archaeological impacts.

Issue	Destruction of archaeological resources	
Description of Impact		
Archaeological resources are damaged, destroyed or moved from their context.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Very low	Very Low
Duration	Permanent	Permanent
Extent	Site	Site

Consequence	Low	Low
Probability	Unlikely / improbable	Unlikely / improbable
Significance	Low -	Low -
Degree to which impact can be reversed	Low – archaeological resources are non-renewable and cannot be recreated on site.	
Degree to which impact may cause irreplaceable loss of resources	High - archaeological resources are non-renewable and irreplaceable.	
Degree to which impact can be mitigated	High – mitigation is easy to apply and would effectively capture archaeological data before development proceeds.	
Mitigation actions		
The following measures are recommended:	No mitigation is suggested.	
Monitoring		
The following monitoring is recommended:	None.	
Cumulative impacts		
Nature of cumulative impacts	Direct	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Very low -	Very Low -

6.2. Impacts to the cultural landscape

Impacts to the cultural landscape relate to the visual intrusion of the new electrical infrastructure into the rural cultural landscape. In this instance, however, it must be noted that a large amount of electrical infrastructure is already present in the landscape. This infrastructure includes many powerlines and two large substations, one of which lies close to the proposed development area. The proposed powerline is substantially smaller than most of those existing. As a result, the intensity of the new impact is rated as very low. The impacts will occur for as long as the powerline remains present (i.e. long term). Because of the small size of the powerline, the extent is rated as site. Before mitigation the impact significance is rated as being **low negative** (Table 4). The proposed infrastructure cannot be meaningfully hidden and the landscape already has much similar infrastructure present. As such, only best practice measures related to minimising disturbance footprint and rehabilitating all areas not required during operation can be suggested. The impacts post-mitigation will remain **low negative**. There are no fatal flaws in terms of the cultural landscape.

Table 4: Assessment of impacts to the cultural landscape.

Issue	Impacts to the cultural landscape	
Description of Impact		
Visual intrusion of electrical infrastructure into the rural cultural landscape.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction, Operation, Decommissioning	
Criteria	Without Mitigation	With Mitigation
Intensity	Very low	Very low
Duration	Long-term	Long-term
Extent	Site	Site
Consequence	Low	Low

Probability	Definite / Continuous	Definite / Continuous
Significance	Low -	Low -
Degree to which impact can be reversed	High – With removal of all infrastructure and rehabilitation of the site, the current status quo could be recreated.	
Degree to which impact may cause irreplaceable loss of resources	Low – the grasslands of the South African interior are extensive and similar landscapes occur elsewhere.	
Degree to which impact can be mitigated	Low – There is nothing that can be done to hide the powerline.	
Mitigation actions		
The following measures are recommended:	Minimise disturbance footprint. Rehabilitate all areas not required during operation. Minimise size of access track.	
Monitoring		
The following monitoring is recommended:	None	
Cumulative impacts		
Nature of cumulative impacts	Direct	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Low -	Low -

6.3. Cumulative impacts

Cumulative impacts occur through the implementation of many developments in the surrounding area. This assessment includes all approved electrical facilities within a 30 km radius of the project site. Because of the strongly electrical nature of the area currently, the cumulative impacts are rated as low negative.

6.4. Evaluation of impacts relative to sustainable social and economic benefits

Section 38(3)(d) of the NHRA requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development.

The proposed project is intended to connect a solar energy facility to the national electricity grid. The facility will produce electricity for South Africa. With the country having a shortage of reliable electricity supply which leads to frequent load-shedding, any new generation capacity will be a benefit to society. Aside from this obvious benefit, the currently proposed project will provide a small number of jobs during the construction phase. Given the relatively limited heritage impacts, these socio-economic benefits can be seen to outweigh the impacts.

6.5. Existing impacts to heritage resources

There are currently no obvious threats to heritage resources on the site aside from the natural degradation, weathering and erosion that will affect the archaeological materials. Trampling from grazing animals and/or farm/other vehicles could also occur. These impacts would be of **negligible negative** significance. The cultural landscape has already been affected by electrical development through the construction of substations and many powerlines. This existing impact is considered to be of **medium negative** significance.

6.6. The No-Go alternative

If the project were not implemented then the site would stay as it currently is. The heritage impacts with implementation are of little to no concern. There would be a loss of socio-economic benefits through not being able to connect the solar energy facility to the national grid. The No-Go option is thus slightly less desirable.

6.7. Levels of acceptable change

Any impact to an archaeological or palaeontological resource or a grave is deemed unacceptable until such time as the resource has been inspected and studied further if necessary. Such impacts are not expected. Impacts to the landscape are difficult to quantify but in general a development that visually dominates the landscape from many vantage points is undesirable. The presently proposed powerline is a small one and, in the context of the many existing large powerlines in the area, it will result in negligible change to the visual character of the area.

7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAM

The actions recorded in Table 5 should be included in the environmental management program (EMPr) for the project².

Table 5: Heritage considerations for inclusion in the EMPr.

Impact	Mitigation / management objectives & outcomes	Mitigation / management actions	Monitoring		
			Methodology	Frequency	Responsibility
Impacts to archaeology and graves					
Damage or destruction of archaeological sites	Avoid impacts (preferred) or sample sites before disturbance	Report any dense concentrations of artefacts discovered during construction	Inform staff and carry out inspections of excavations	Ongoing basis	Project developer
				Whenever on site (at least weekly)	ECO
Damage or destruction of archaeological sites or graves	Rescue information, artefacts or burials before extensive damage occurs	Reporting chance finds as early as possible, protect <i>in situ</i> and stop work in immediate area	Inform staff and carry out inspections of excavations	Ongoing basis	Construction Manager or Contractor
				Whenever on site (at least weekly)	ECO
Impacts to the cultural landscape					
Visible landscape scarring	Minimise landscape scarring	Ensure disturbance is kept to a minimum and does not exceed project requirements. Rehabilitate areas not needed during operation.	Monitoring of surface clearance relative to approved layout	Ongoing basis	Construction Manager or Contractor
				As required	ECO

² This would be the EMPr for the larger project discussed in Section 1.1.1.

8. CONCLUSIONS

The only heritage issues for this project are the potential destruction of archaeological materials and the visual intrusion of the infrastructure into the cultural landscape. However, neither of them is a significant concern for the approval of the project because no known archaeological materials occur – or are expected to occur – on site, and the landscape is now largely an electrical landscape. In conjunction with all the other existing and approved (but not yet constructed) electrical facilities in the immediate area, the new powerline would not be out of place. Table 6 lists the heritage indicators and shows how they are met. There are no remaining heritage issues.

Table 6: Heritage indicators and project responses.

Indicator	Project Response
Significant archaeological materials should not be disturbed without appropriate study.	No significant materials are known or expected to occur within the development footprint.
The proposed project should not dominate views from multiple directions.	The proposed powerline is small and will not be visually prominent in the landscape.

8.1. Reasoned opinion of the specialist

Given that the archaeological material likely to occur within the footprint would be of very low cultural significance, and that the landscape is essentially an electrical one in which the proposed new infrastructure would not be out of place, it is the opinion of the heritage specialist that the proposed project should be approved in full.

9. RECOMMENDATIONS

It is recommended that the proposed 33 kV powerline should be approved but subject to the following recommendation:

- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

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APPENDIX 1 – Curriculum Vitae



Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

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Birth date and place: 22 June 1976, Cape Town, South Africa
Citizenship: South African
ID no: 760622 522 4085
Driver's License: Code 08
Marital Status: Married to Carol Orton
Languages spoken: English and Afrikaans

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science) 1997	
University of Cape Town	B.A. (Honours) (Archaeology)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Professional Accreditation:

Association of Southern African Professional Archaeologists (ASAPA) membership number: 233

CRM Section member with the following accreditation:

- Principal Investigator: Coastal shell middens (awarded 2007)
Stone Age archaeology (awarded 2007)
Grave relocation (awarded 2014)
- Field Director: Rock art (awarded 2007)
Colonial period archaeology (awarded 2007)

Association of Professional Heritage Practitioners (APHP) membership number: 43

- Accredited Professional Heritage Practitioner

➤ **Memberships and affiliations:**

South African Archaeological Society Council member	2004 – 2016
Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
UCT Department of Archaeology Research Associate	2013 –
Heritage Western Cape APM Committee member	2013 –
UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
Fish Hoek Valley Historical Association	2014 –
Kalk Bay Historical Association	2016 –
Association of Professional Heritage Practitioners member	2016 –

Fieldwork and project experience:

Extensive fieldwork and experience as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

Feasibility studies:

- Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- Project types
 - Notification of Intent to Develop applications (for Heritage Western Cape)
 - Desktop-based Letter of Exemption (for the South African Heritage Resources Agency)
 - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
 - Archaeological specialist studies
 - Phase 1 archaeological test excavations in historical and prehistoric sites
 - Archaeological research projects
- Development types
 - Mining and borrow pits
 - Roads (new and upgrades)
 - Residential, commercial and industrial development
 - Dams and pipe lines
 - Power lines and substations
 - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

Phase 2 mitigation and research excavations:

- ESA open sites
 - Duinefontein, Gouda, Namaqualand
- MSA rock shelters
 - Fish Hoek, Yzerfontein, Cederberg, Namaqualand
- MSA open sites
 - Swartland, Bushmanland, Namaqualand
- LSA rock shelters
 - Cederberg, Namaqualand, Bushmanland
- LSA open sites (inland)
 - Swartland, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
 - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
 - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
 - Franschhoek (farmstead and well), Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
- Historic burial grounds
 - Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl

Awards:

Western Cape Government Cultural Affairs Awards 2015/2016: Best Heritage Project.

Palaeontology

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

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2. SITE SENSITIVITY VERIFICATION METHODOLOGY	4
3. OUTCOME OF SITE SENSITIVITY VERIFICATION	4
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1. INTRODUCTION

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing the development of (1) Main Transmission Substation (MTS) and three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines), Li-Ion Battery Energy Storage System, the associated electrical infrastructure, (the 'proposed development') that will connect to the authorised Solar Energy Facilities i.e. Kentani, Klipfontein, Klipfontein 2, Leliehoek, Sonoblomo, Braklaagte, Boschrand 2, Meeding, Irene and Braambosch, collectively known as the Kentani Cluster located near the town of Dealesville, Tokologo Local Municipality (Lejweleputswa District) in the Free State Province. The proposed development will also involve the re-routing of eight (8) 132kV powerlines within the grid connection corridor which has been authorised as part of the Kentani Cluster, making provision for this routing in the new proposed MTS (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

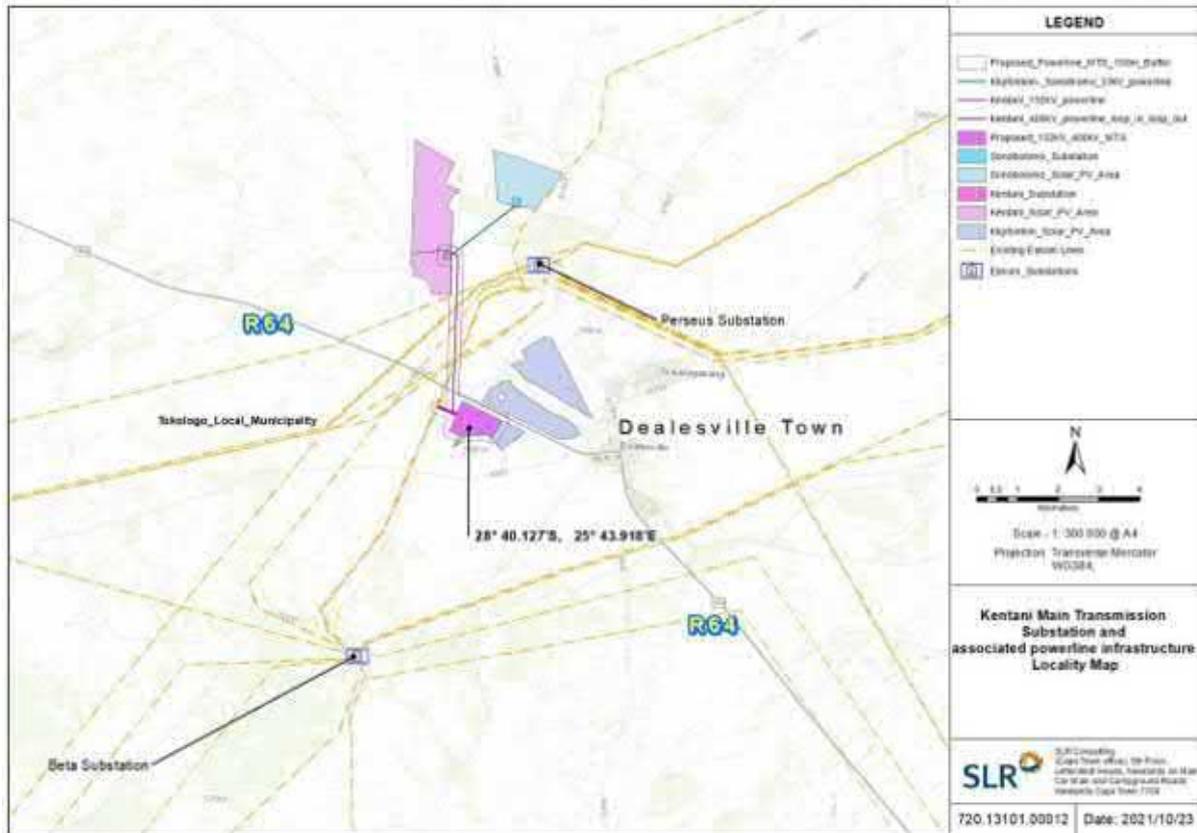


Figure 1: Locality Map of the proposed Main Transmission Substation (MTS) and associated electrical infrastructure (including grid connection corridors)

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)]. 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), which is proposed on the Remaining Extent of the Farm Klipfontein No. 305 (SG Code: F0040000000030500000). Of the eleven (11) powerlines, eight (8) are 132kV powerlines which are located within the authorised corridor, and which have been included as part of the authorised solar PV developments. 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).

Considering the above, it is important to note that the location of the proposed MTS as well as the corridors being proposed for the powerlines 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.

Moreover, the proposed MTS and powerlines are located within the Kimberly Renewable Energy Development Zone and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notices No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively. 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) will 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. 800m in length) are being proposed and will connect the proposed MTS to the existing Eskom 400kV powerline, located approximately 1km west of the proposed MTS site, via a Loop-In-Loop Out (LILO) connection; and
2. One (1) 132kV powerline (approx. 4km in length) is being proposed and 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.
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 Sonobloomo 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 not trigger the need for an Application for Environmental Authorisation, however, the powerline has been considered by the specialist team.

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.

As part of the BA process, powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the 400kV and 132kV powerlines. 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. In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations [4 December 2014, Government Notice (GN) R982, R983, R984 and R985, 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 Department of Forestry, Fisheries and the Environment (DFFE), prior to the commencement thereof. One (1) application for EA for the proposed development will be submitted to the DFFE, in the form of a BA process, in terms of the NEMA EIA Regulations of 2014 (as amended).

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).

In accordance with GN 320 and GN 1150 (20 March 2020)² of the NEMA EIA Regulations of 2014 (as amended), prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (i.e., Screening Tool). Mrs Elize Butler, as the Palaeontology Specialist, has been commissioned to verify the sensitivity of the 132kV/400kV Main Transmission Substation (MTS) and Associated Infrastructure project site under these specialist protocols.

The scope of this report is the 132kV/400kV MTS and Associated Infrastructure application.

2. SITE SENSITIVITY VERIFICATION METHODOLOGY

The Palaeontology Sensitivity Verification was undertaken by the following methodology:

- Desktop analysis of satellite imagery to determine the topography of the area and to identify possible fossiliferous outcrops.
- Desktop analysis of the development footprint by mapping the site on the relevant Geological Map to determine the underlying geology of the development.
- Desktop analysis of the development footprint on the SAHRIS PalaeoMap to establish the Sensitivity of the proposed development and establishing if a site investigation is necessary.
- Conducting extensive fieldwork on foot and by motor vehicle to identify any fossiliferous outcrop in the proposed development.

3. OUTCOME OF SITE SENSITIVITY VERIFICATION

The proposed Mainstream 132kV/400kV On-site MTS, BESS and associated infrastructure is underlain by Quaternary sediments mantling Jurassic dolerite, and the Tierberg Formation (Ecca Group, Karoo Supergroup; Figure 2). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database (Figure 3), the Palaeontological Sensitivity of the Quaternary superficial sediments (Qs, Qc) is moderate, that of the Jurassic dolerite (Jd) is Zero as it is igneous in origin, while the Tierberg Formation (Pt) has a High Palaeontological Sensitivity (Almond and Pether, 2009; Almond et al., 2013;).

² GN 320 (20 March 2020): 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

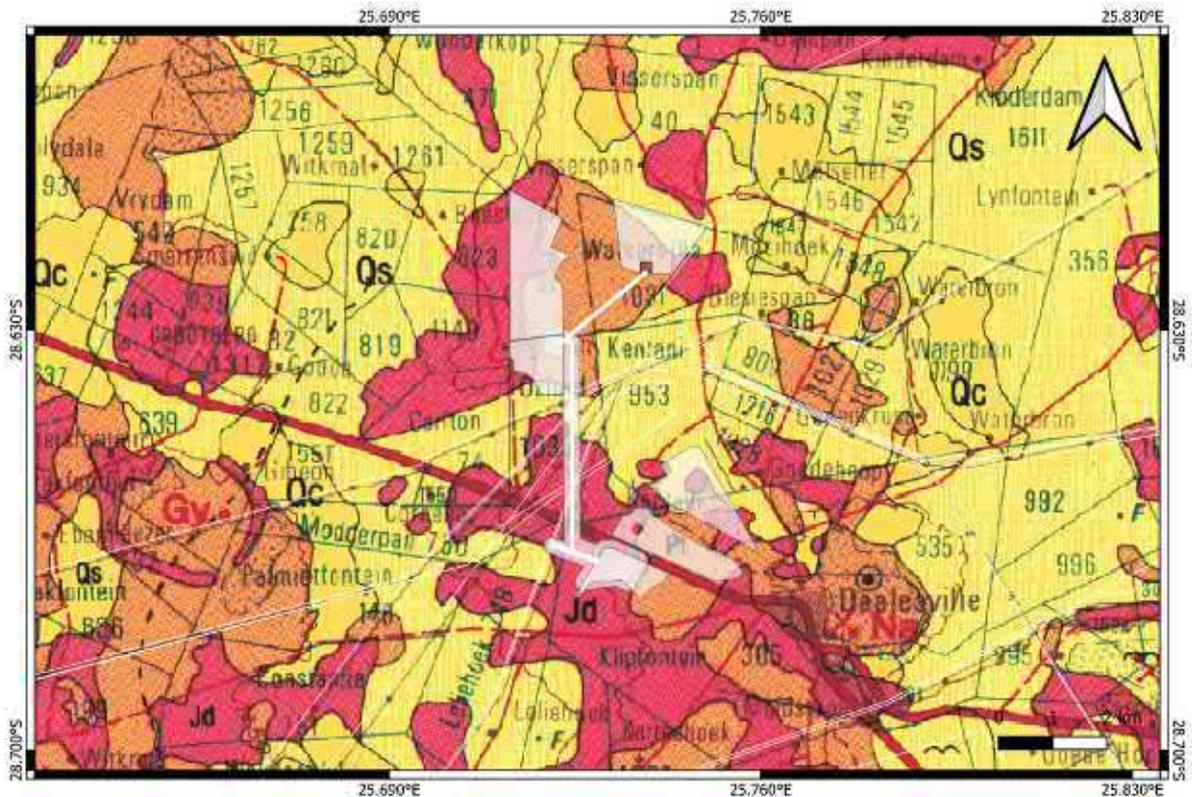


Figure 2: Extract of the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria) indicating (in white) the proposed Mainstream 132kV/400kV On-site MTS and associated infrastructure near Dealsville in the Free State.

Table 1: 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).

Symbol	Stratigraphy	Lithology
Qs	Quaternary	Sand: Red ab=nd grey Gravel, Diamondiferous in places
Qc	Quaternary	Calcrete
Jd	Jurassic	Dolerite
Pt	Tierberg Formation, Ecca Group, Karoo Supergroup	Sandstone, siltstone, mudstone

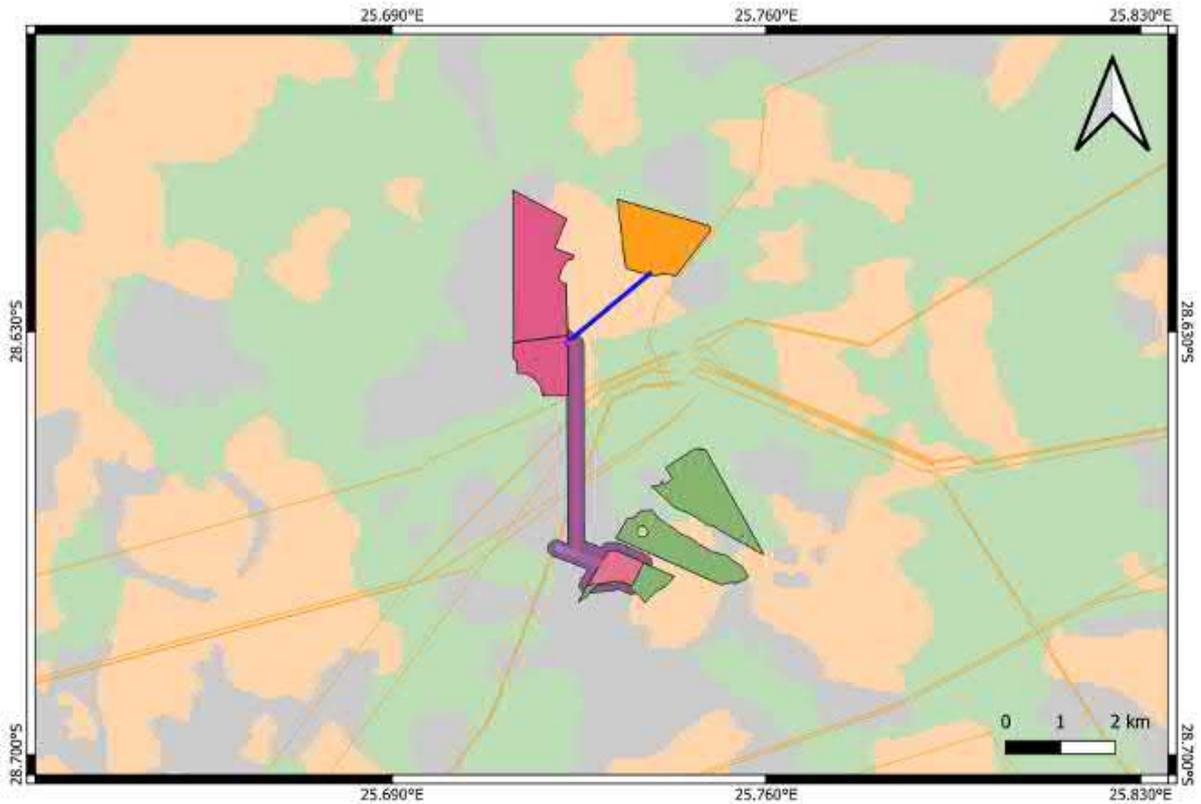


Figure 3: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences). Proposed powerline is indicated in colours. According to the SAHRIS Palaeosensitivity map the proposed development is underlain by sediments with a High (orange,) Medium (green) and areas of Zero (grey) Palaeontological 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 Sensitivity of rocks in the development is indicated in bold. The colours on the PalaeoMap indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero

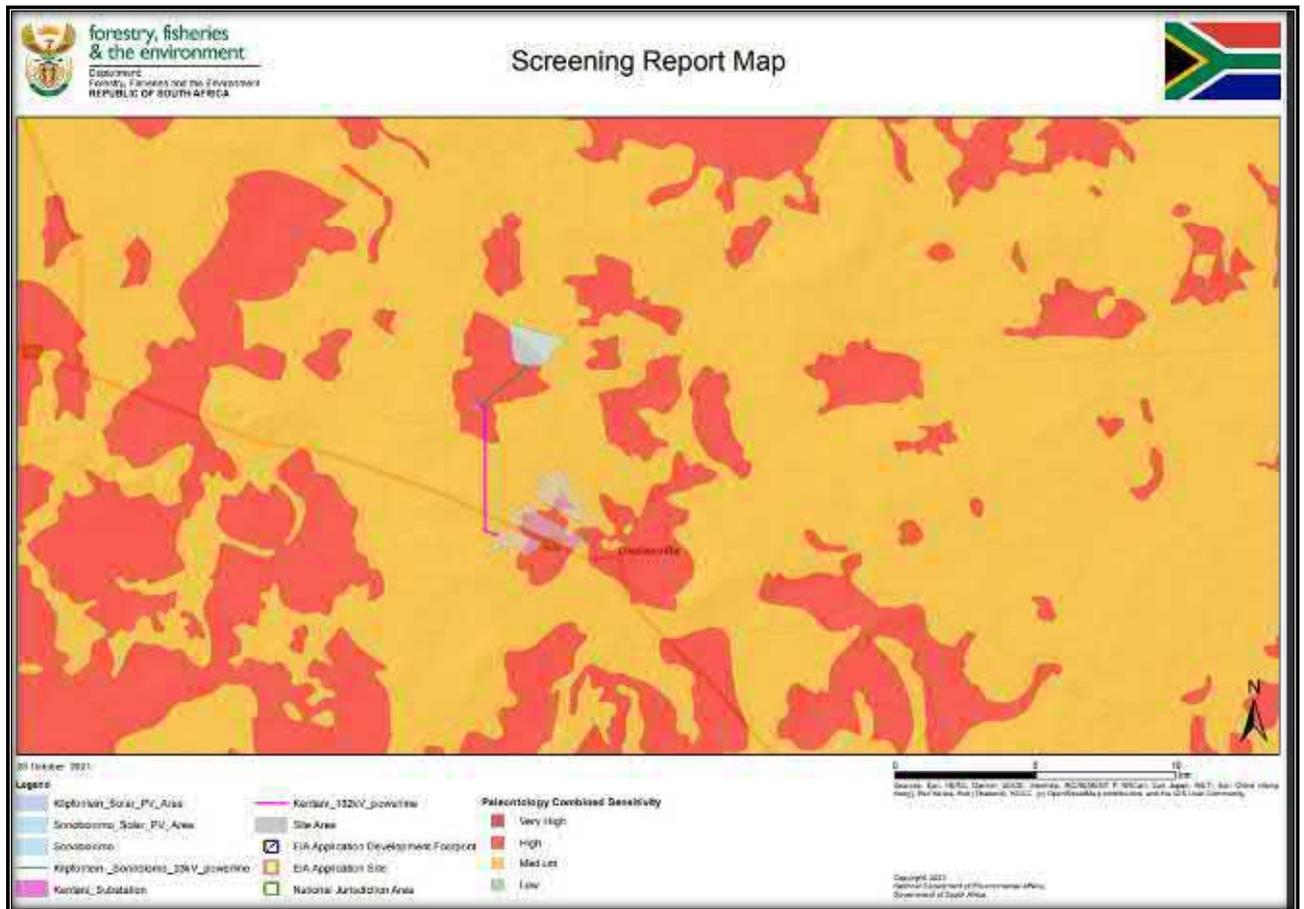


Figure 4: Palaeontological Sensitivity generated by the DFFE Screening

According to the DFFE Screening tool the Sensitivity of the proposed Mainstream 132kV/400kV On-site MTS, BESS and associated infrastructure near Dealsville in the Free State is High (red) and Moderate (orange).

A thorough site-specific field survey of the proposed Mainstream electrical development was conducted on foot and by motor vehicle where no visible evidence of fossiliferous outcrops was found. This is in contradiction with both the DFFE Screening tool and SAHRIS PalaeoMap.

4. CONCLUSION

The DFFE Screening tool indicates that the Sensitivity of the development footprint varies from High to Very High. The SAHRIS PalaeoMap in turn indicates that the Sensitivities varies between Zero, moderate to High. During a site visit no fossiliferous outcrops were identified. **However, the likelihood of finding fossils in outcrops just below the surface is possible. A Chance Find protocol is thus included in the report.**



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

PALAEOLOGICAL 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)

<p>Regulation GNR 326 of 4 December 2014, as amended 7 April 2017,</p> <p>Appendix 6</p>	<p>Section of Report</p>
<p>1. (1) A specialist report prepared in terms of these Regulations must contain-</p> <p>a) details of-</p> <p style="padding-left: 40px;">i. the specialist who prepared the report; and</p> <p style="padding-left: 40px;">ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;</p>	<p>Page vi</p> <p>Appendix 2</p>
<p>b) a declaration that the specialist is independent in a form as may be specified by the competent authority;</p>	<p>Page iv</p>
<p>c) an indication of the scope of, and the purpose for which, the report was prepared;</p>	<p>Section 2.3</p>
<p>(cA) an indication of the quality and age of base data used for the specialist report;</p>	<p>Section 5</p>
<p>(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;</p>	<p>Section 7</p>
<p>d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;</p>	<p>Section 9</p>
<p>e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;</p>	<p>Section 2.3</p>
<p>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;</p>	<p>Section 5</p>
<p>g) an identification of any areas to be avoided, including buffers;</p>	<p>N/A</p>

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- <ul style="list-style-type: none"> 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 <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.	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			
Specialist Qualifications:	MSc			
Professional affiliation/registration:	PSSA			
Physical address:	14 Eddie de Beer Street, Dan Pienaar, Bloemfontein			
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Postal code:	9301	Cell:	084 4478 759	
Telephone:		Fax:		
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).

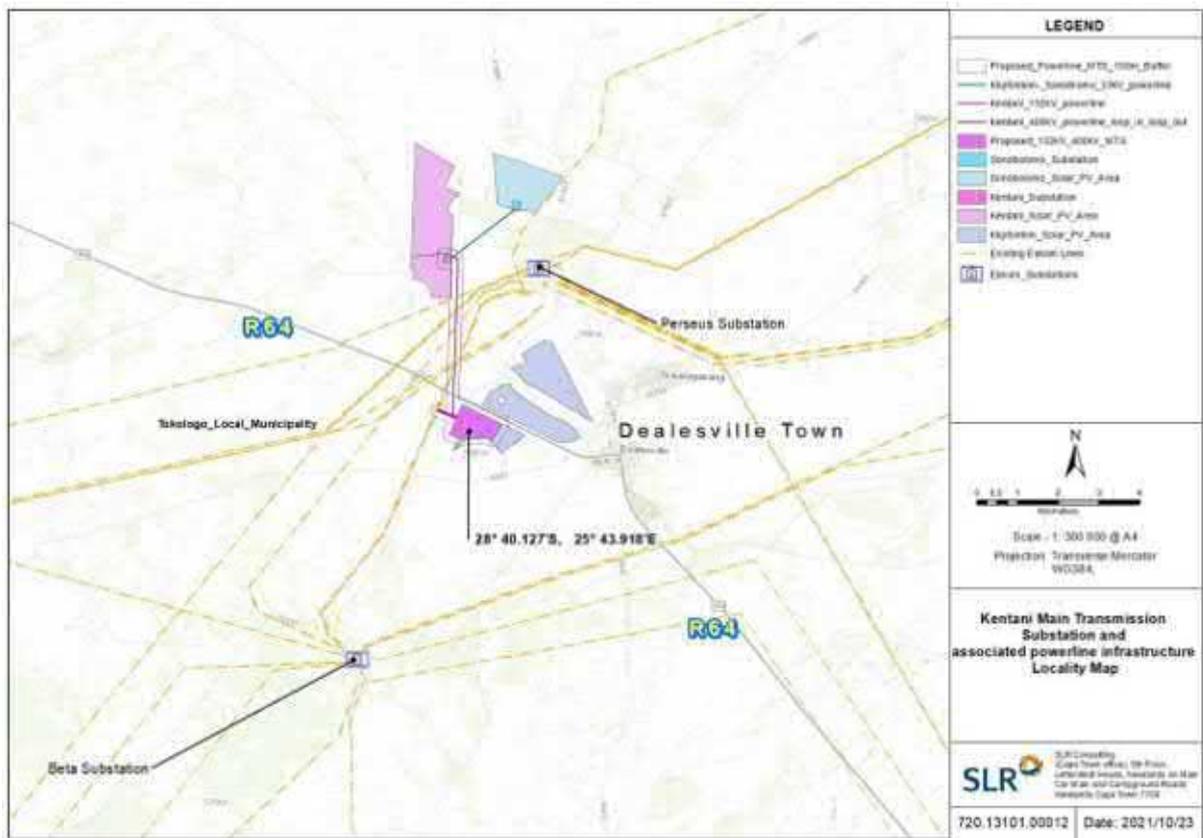


Figure 1:Locality map

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/km’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).

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 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 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. The proposed project will be located on the following properties / farm portions:

- Remaining Extent of the Farm Klipfontein No. 305 (F0040000000030500000);
- The Farm Leliehoek No. 748 (F0040000000074800000);
- Remainder of the Farm Oxford No. 1030 (F00400000000103000000);
- The Farm Overshot No. 31 (F0040000000003100000)
- 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 2016¹.

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) will 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	<ul style="list-style-type: none"> • 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 - F0040000000003100000
Onsite Main Transmission Substation (MTS)	<ul style="list-style-type: none"> • 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 2016¹) 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)	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • One (1) new road in servitude under proposed powerlines

	<ul style="list-style-type: none">• One (1) new access to the R64 provincial route• Widths of up to approx. 4-8m
BESS	<ul style="list-style-type: none">• 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 not trigger the need for an Application for Environmental Authorisation, however, the powerline has been considered by the specialist team.

(Figure 2).

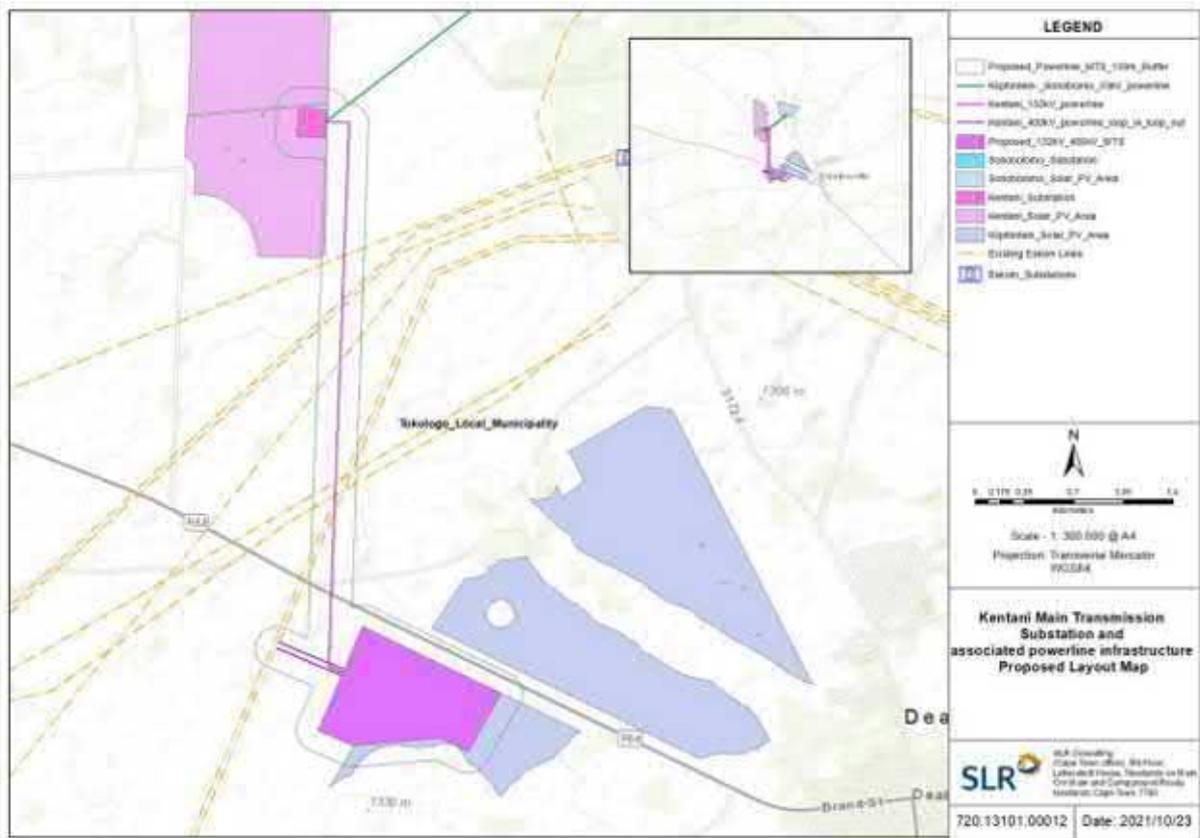


Figure 2: Proposed layout

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 km² while it was larger in the past [~2 000 000 km² (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 volcanoclastic 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.

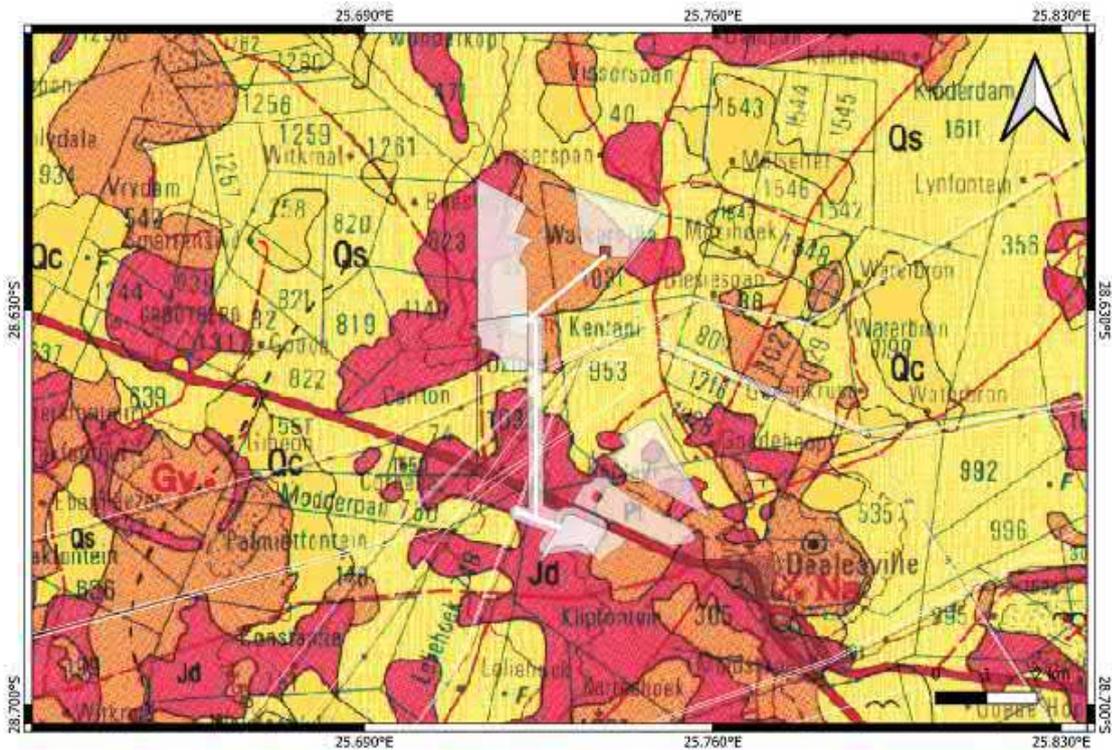


Figure 3: Extract of the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria) indicating (in white) the proposed Mainstream 132kV/400kV On-site MTS and associated infrastructure near Dealsville in the Free State.

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

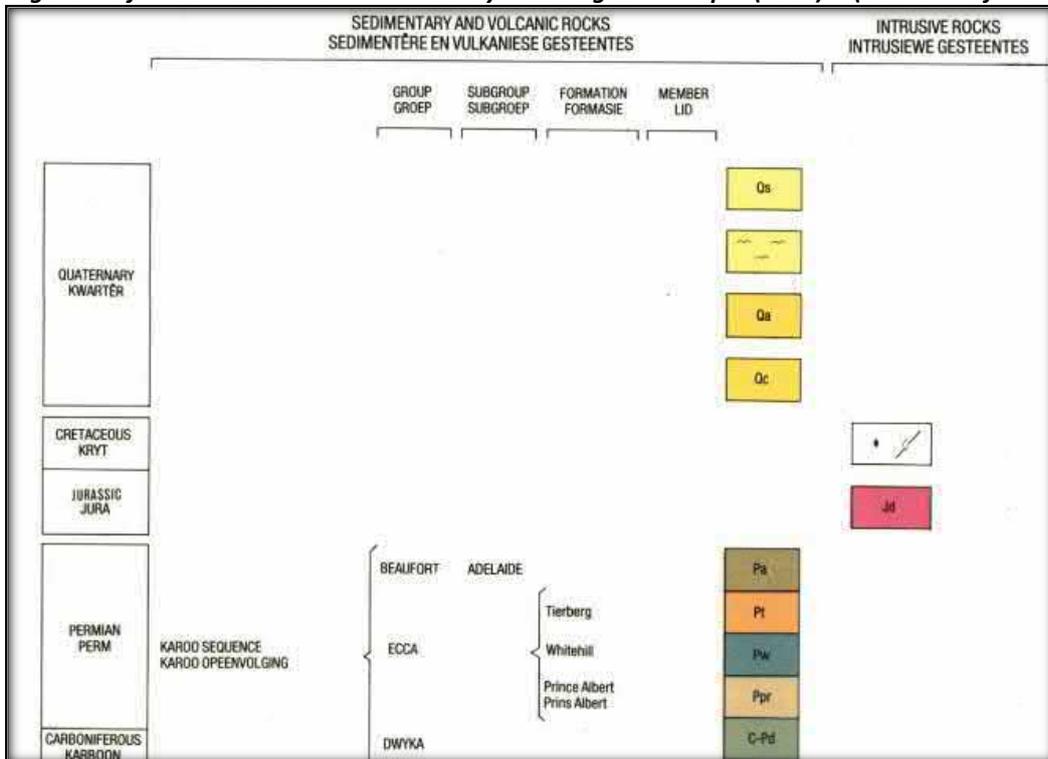


Table 2: Legend to Map and short explanation of the development and surrounding sediments (Modified from the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria). Formations present in the development is indicated in bold

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

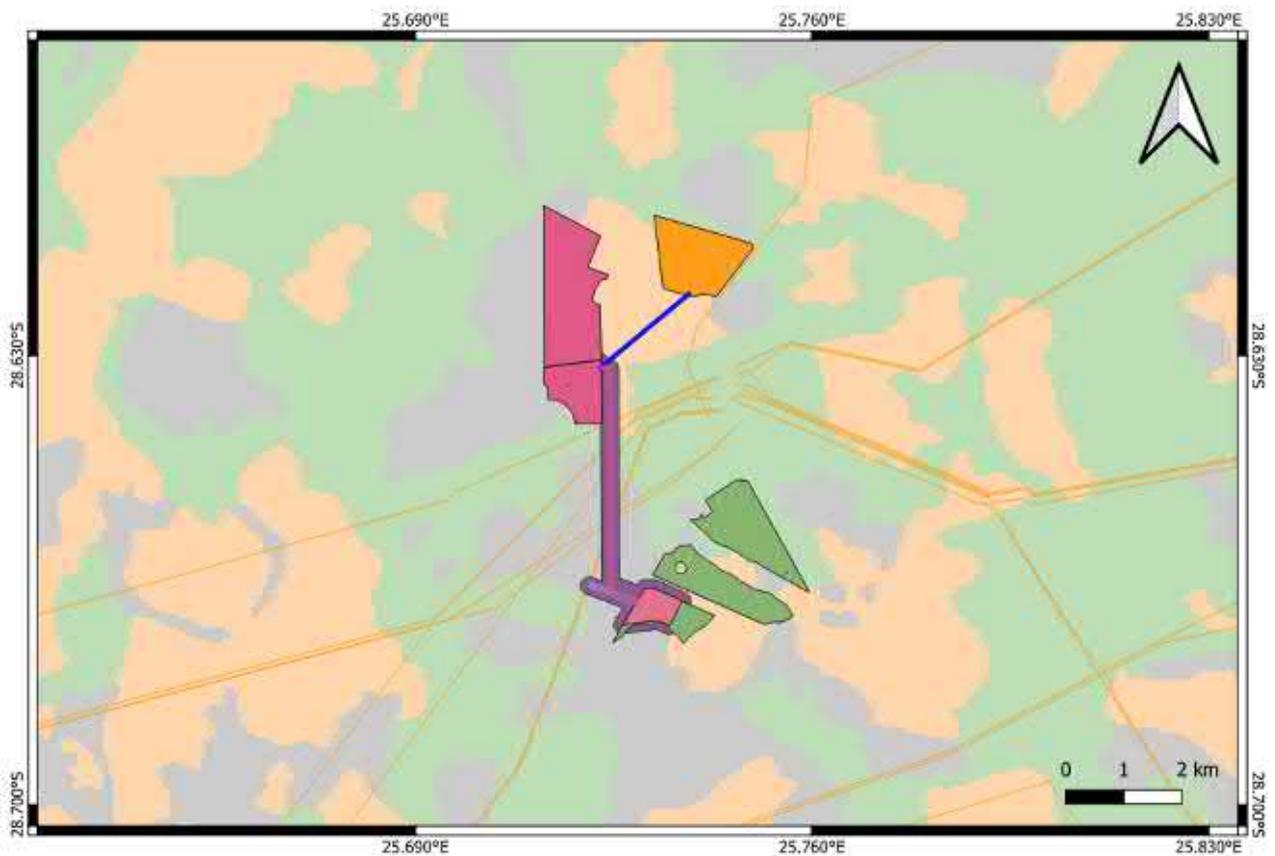


Figure 4: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences). Proposed powerline is indicated in colors. According to the SAHRIS Palaeosensitivity map the proposed development is underlain by sediments with a High (orange,) Medium (green) and areas of Zero (grey) Palaeontological 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 decommissioning 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 time⁴ 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 time⁴, 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 Faraday 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.

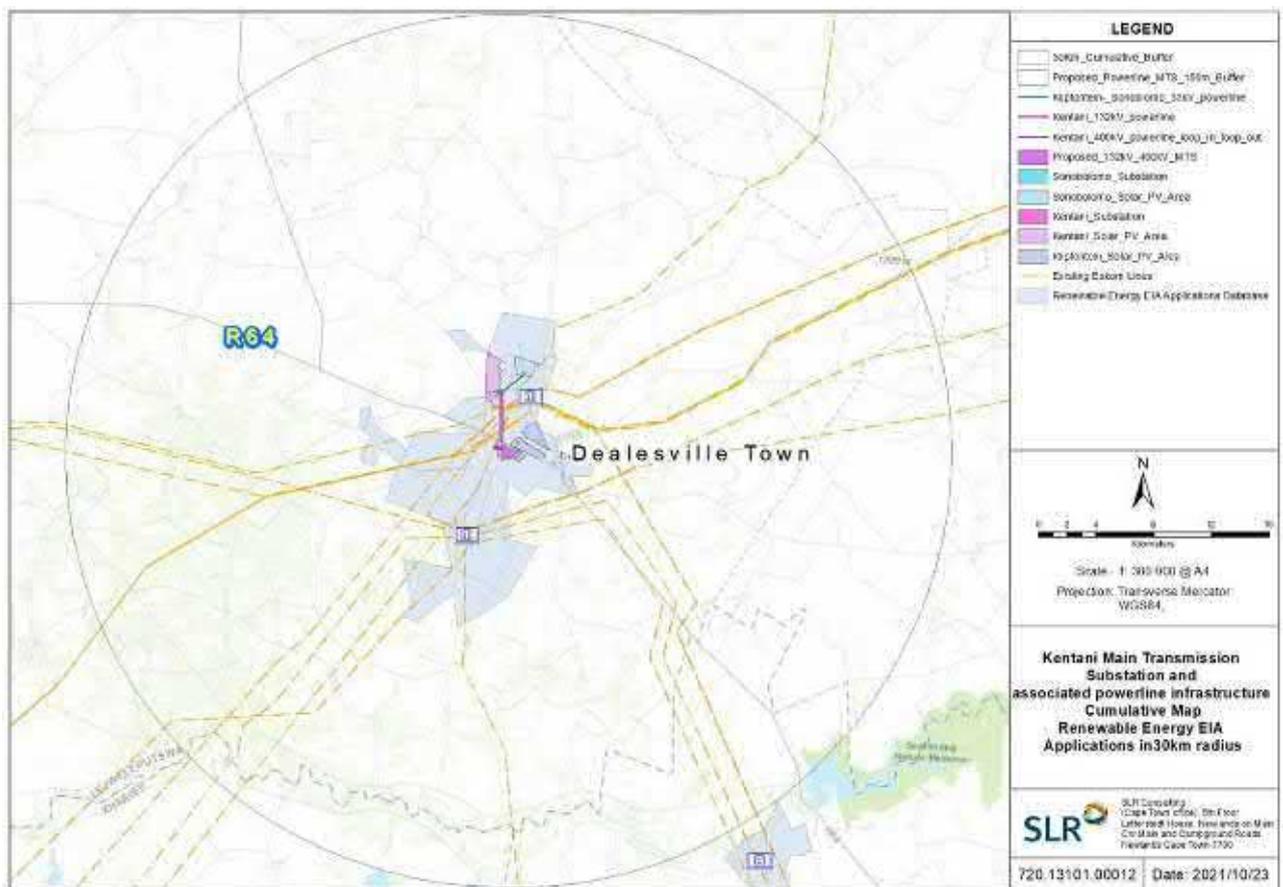


Figure 714: Cumulative Map indicating REFs within the 30km buffer of the proposed MTS and Powerlines (including Powerline Corridors)

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 palaeontological 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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**PROPOSED 33 KV POWERLINE NEAR DEALESVILLE,
WITHIN THE LEJWELEPUTSWA DISTRICT MUNICIPALITY, IN THE FREE STATE**

PALAEONTOLOGICAL IMPACT ASSESSMENT

DFFE Reference: To be Allocated

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EXECUTIVE SUMMARY

Banzai Environmental was appointed by SLR Consulting (South Africa) (Pty) Ltd to conduct the Palaeontological Impact Assessment for the proposed development of a 33 kV powerline northwest of Dealesville, Tokologo Local Municipality, within the Lejweleputswa District Municipality, in the Free State. This proposed powerline will be situated on the Remaining Extent of the Farm Walkerville 1031, Portion 1 of Walkerville 1031, Farm Overshot 31 and the Remaining Extent of the Farm Oxford 1030.

The proposed 33kV powerline construction is primarily 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 the Tierberg Formation is High (Almond and Pether, 2009; Almond *et al.*, 2013)

A site-specific field survey of the proposed 33kV powerline 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 33kV powerline 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;	Section 9

<p>(iA) regarding the acceptability of the proposed activity or activities; and</p> <p>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;</p>	
<p>o) a description of any consultation process that was undertaken during the course of preparing the specialist report;</p>	N/A
<p>p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and</p>	No
<p>q) any other information requested by the competent authority.</p>	No
<p>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.</p>	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 Pty Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	Level 4	Percentage Procurement recognition	51%
Specialist name:	Elize Butler			
Specialist Qualifications:	MSc			
Professional affiliation/registration:	PSSA			
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Telephone:		Fax:		
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 favorable 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 Pty Ltd

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 Pty Ltd 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 0-2 to Figure 1-2).

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), which is proposed on the Remaining Extent of the Farm Klipfontein No. 305 (SG Code: F00400000000030500000). Of the eleven (11) powerlines, eight (8) are 132kV powerlines which are located within the authorised corridor, and which have been included as part of the authorised solar PV developments. 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

However, one of the four powerlines (33kV) mentioned above does not activate a listed activity under the National Environmental Management Act (No. 107 of 1998; NEMA) and was consequently not incorporated in the terms of reference for the BA. This powerline is longer than 300m, and consequently trigger the provisions of S.38(1) of the National Heritage Resources Act No. 25 of 1999 (NHRA). The present report assesses the potential palaeontological impacts from this powerline on its own.

The 33kV powerline of about 2km will connect the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723) to the authorised Kentani on-site substation (14/12/16/3/3/2/724).

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 0-1: Google Earth Image (2021) of the proposed 33kV powerline connecting the authorised 75MW Sonoblomo PV facility to the authorised Kentani on-site substation.

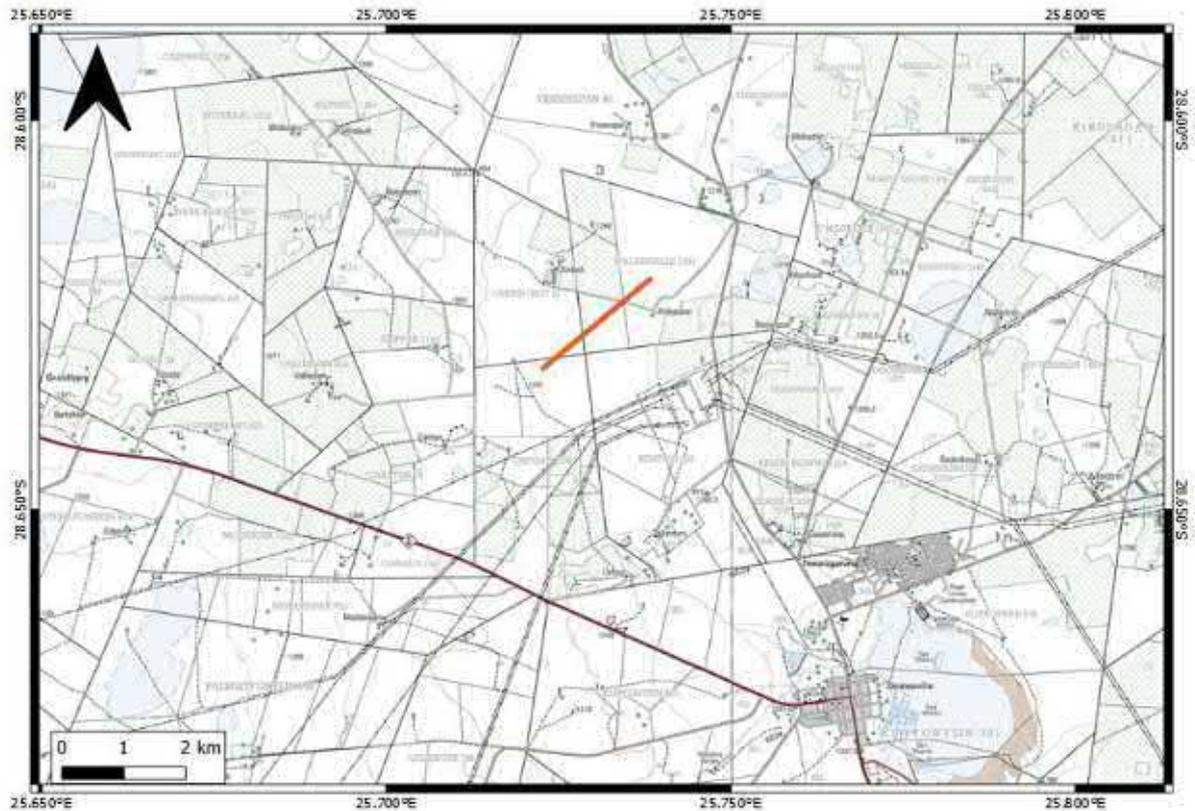


Figure 0-2: Extract from the 1:50 000 topographic map 2825DA and 2825DB indicating the location of the proposed powerline (in orange) relative to Dealesville in the Free State

2 ASSESSMENT METHODOLOGY

2.1 Specialist Credentials

Please see Appendix 1 (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

he 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).

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. 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 PROJECT DESCRIPTION

4.1 Project Location

The proposed 33kV powerline will be approximately 2km in length and will connect the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723), which is about 5km north of the proposed MTS site, to the authorised Kentani on-site substation (14/12/16/3/3/2/724) (about 4km north-west of proposed MTS site). A service track under the proposed powerline will also be required. No corridor is being considered for the proposed 33kV powerline.

This proposed powerline project will be located on the following properties / farm portions:

- Remaining Extent of the Farm Walkerville 1031,
- Portion 1 of Walkerville 1031,
- Farm Overschot 31 and
- the Remaining Extent of the Farm Oxford 1030.

Table 4-1: *GPS coordinates*

North-Eastern End	South-Western End
S28 37'13.5"E 25°44'17.7	S28°37'54.6"E 25°43'21.8"

4.2 Alternatives

No alternative locations have been identified for the proposed 33 kV powerline project as it is part of the infrastructure for the solar facilities.

5 BASELINE DESCRIPTION OF THE RECEIVING ENVIRONMENT

The proposed 33kV powerline connecting the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723), to the authorised Kentani on-site substation (14/12/16/3/3/2/724) MTS site 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 and Figure 5-2).

The overall geology of the area is uniform with only the Quaternary sediments, Jurassic dolerite, and the Tierberg Formation of the Eccca Group (Karoo Supergroup) represented. The proposed powerline is primarily underlain by the Tierberg Formation (Eccca Group, Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Tierberg Formation is High (Almond and Pether, 2009; Almond *et al.*, 2013) (Figure 0-3).

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

The Tierberg Formation 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.

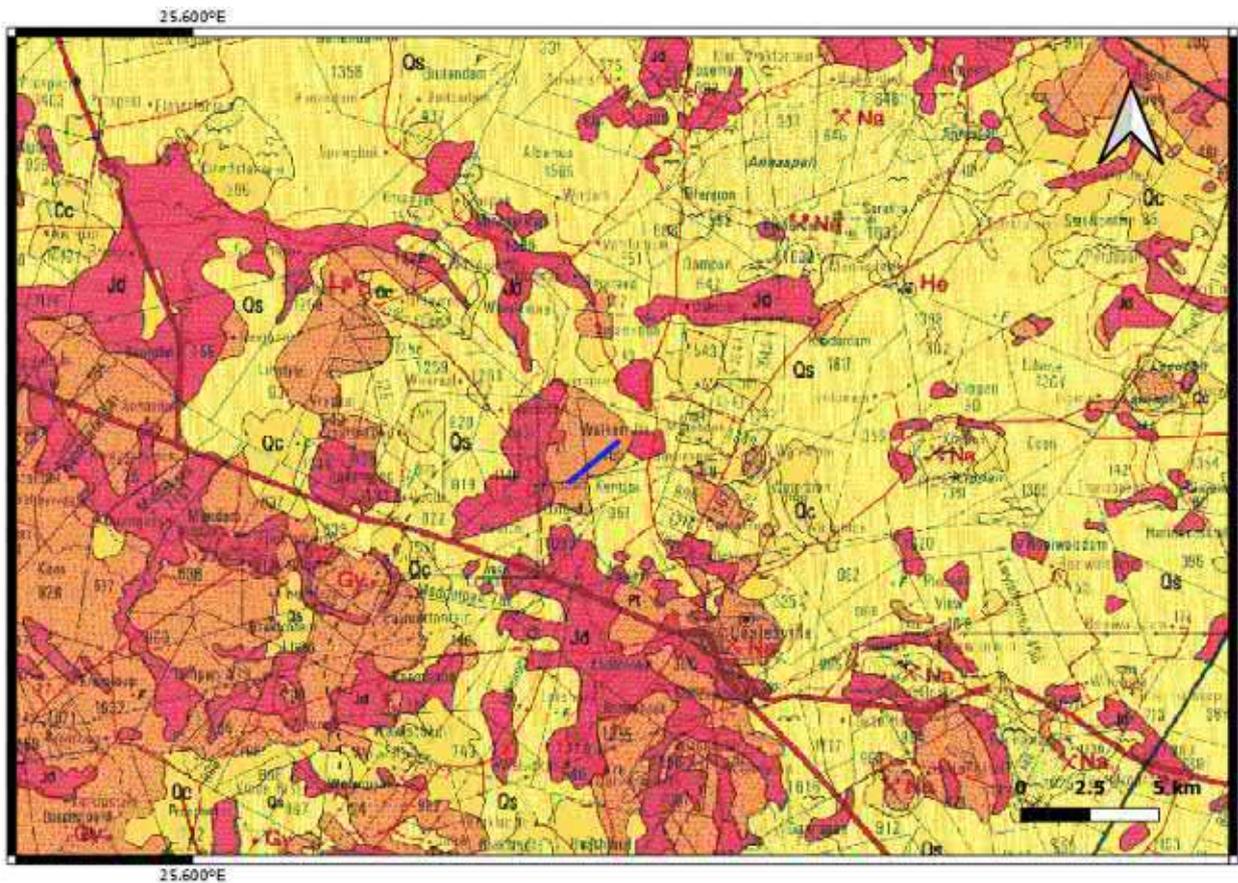


Figure 5-1: Extract of the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria) indicating the proposed 33kV powerline (in blue) connecting the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723), to the authorised Kentani on-site substation (14/12/16/3/3/2/724) MTS site near Dealsville in the Free State.

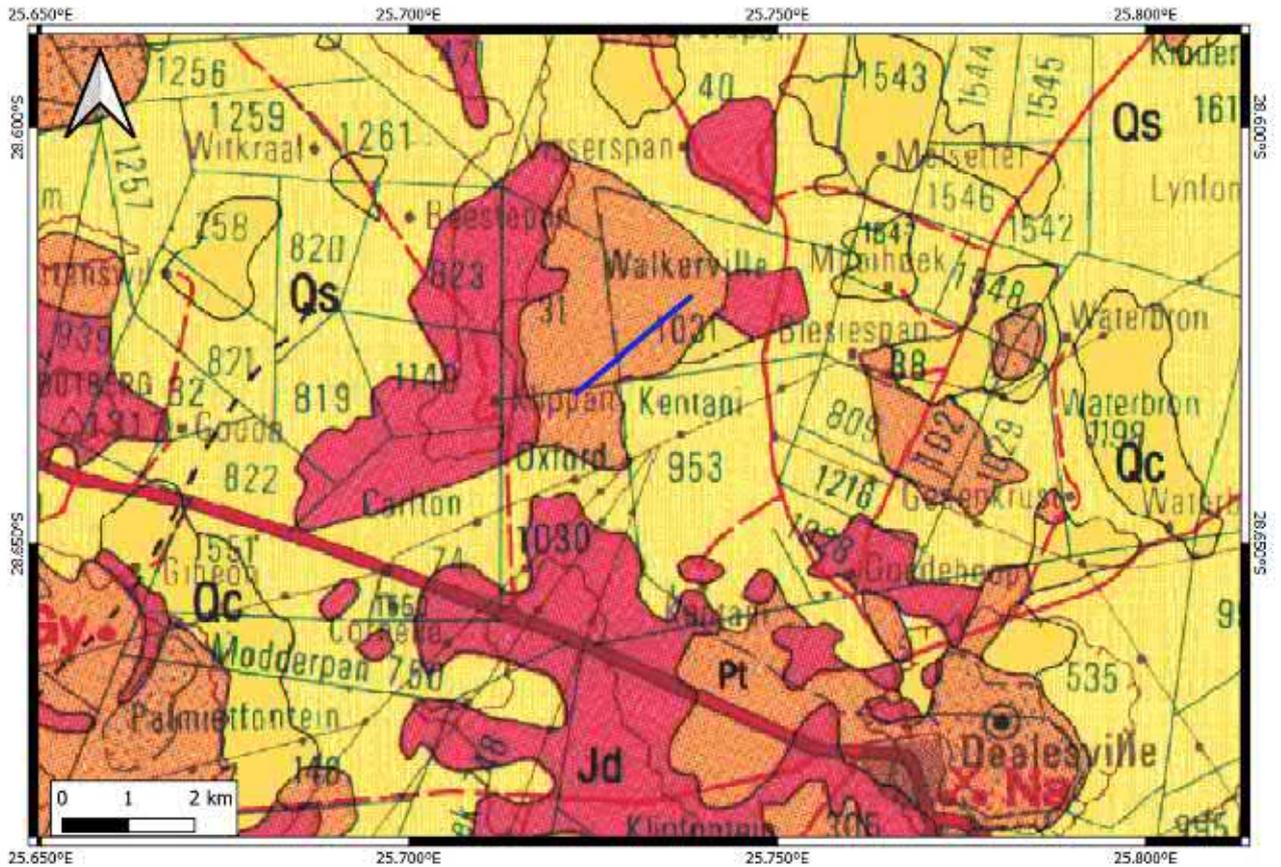


Figure 5-3: Close-up view of the extract of the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria) indicating the proposed 33kV powerline (in blue) connecting the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723), to the authorised Kentani on-site substation (14/12/16/3/3/2/724) MTS site near Dealsville in the Free State.

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

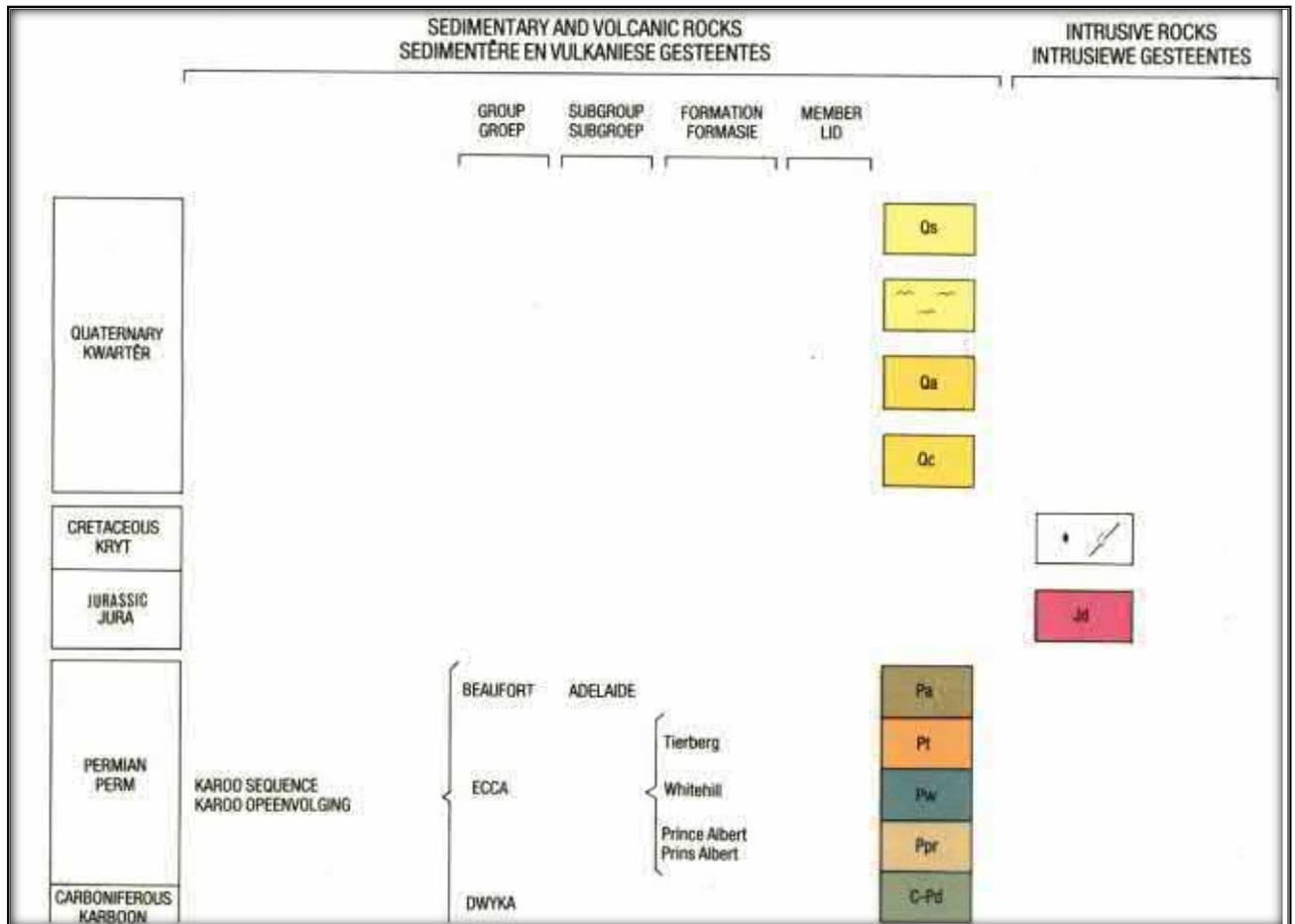


Table 5-2: Legend to Map and short explanation of the development and surrounding sediments (Modified from the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria). Formations present in the development is indicated in bold

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

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 gravel, sand, silt and clay, and they form relatively thin, often discontinuous patches of sediments or larger spreads onshore. These sediments may include stream, channel and floodplain deposits, beach sand, talus gravels and glacial drift sediments.

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 cores 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 is one of the world's 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 km² while it was larger in the past [~2 000 000 km² (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 rheognimbrites. 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 volcanoclastic 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 Karoo Igneous Province can be divided into the Lebombo Group and the Drakensberg Group.

6 SENSITIVITY MAPPING

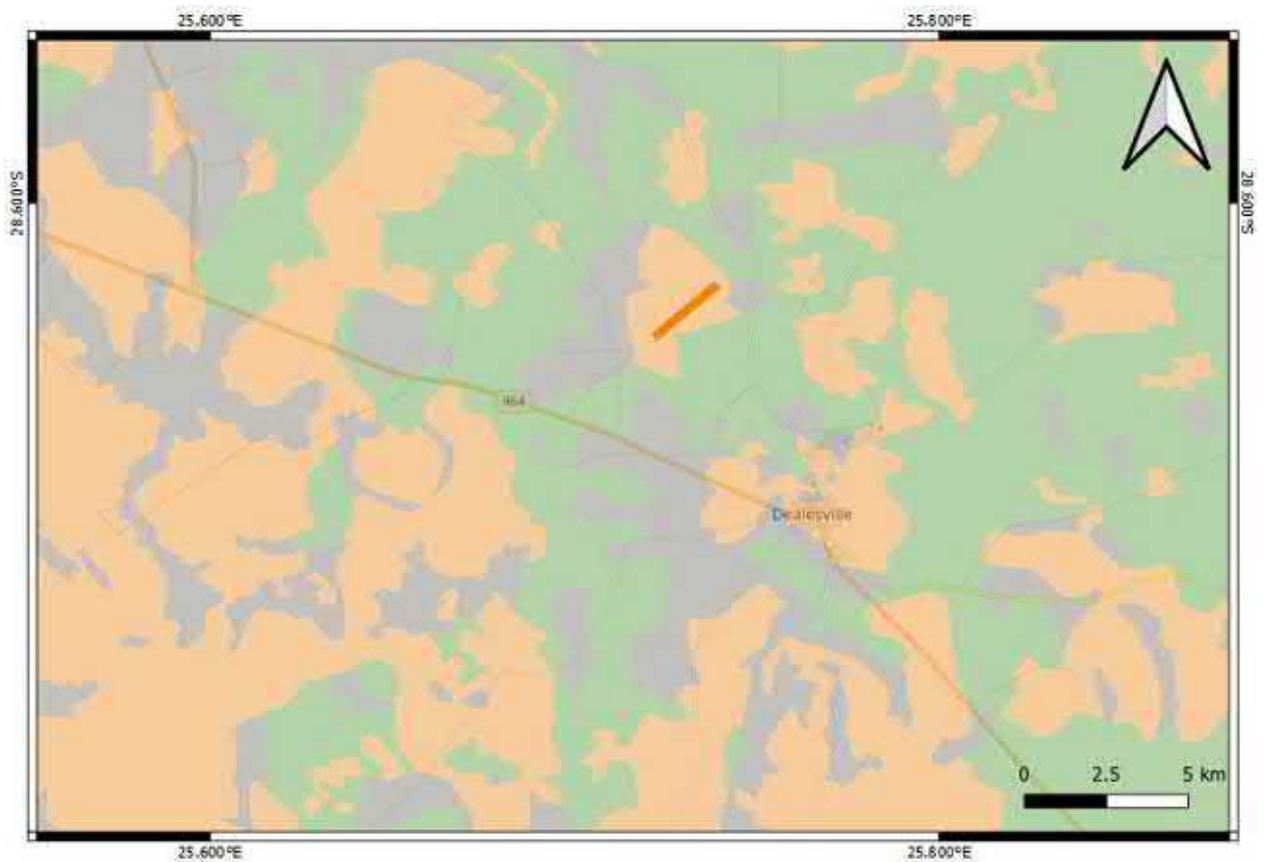


Figure 0-4: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences). Proposed powerline is indicated in orange. According to the SAHRIS Palaeosensitivity map the proposed development is underlain by sediments with a High Sensitivity (orange).

Corresponding with the National Environmental Screening tool) the sensitivity of the proposed powerline development is high. This is in correspondence with the SAHRIAS Palaeomap.

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. No visible evidence of fossiliferous outcrops was identified.



Figure 7-5. View from the east over the proposed 33kV powerline locality.
Grassy vegetation with no evidence of an outcrop.



Figure 7-6. View from the south over the proposed 33kV powerline locality.

Grassy vegetation with no evidence of an outcrop.

7.1 Impact assessment

Table 0-3: Rating of impacts template and example

33 kV powerline development northwest of Dealesville, Free State: Impact Assessment Ratings

Impact 1		Construction Phase	
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	
Cumulative impacts		
Nature of cumulative impacts	Loss of Fossil Heritage	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	High -	Medium -

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

No Alternatives is being considered for the proposed 33kV powerline.

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 time² 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

² 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.

eleven (11) authorised solar PV projects and associated electrical infrastructure. According to the information available at the time², 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 Faraday PV solar projects and associated infrastructure - [14/12/16/3/3/2/855](#)
- 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 Impacts of the area will include approved electrical facilities within a 30 km radius of the project site. As the 33kV Powerline is underlain by similar geology as the rest of the projects the Impact on these developments will all be similar. The Palaeontological Significance of this current powerline construction is rated as Low and the cumulative Impacts will thus also be Low Negative.

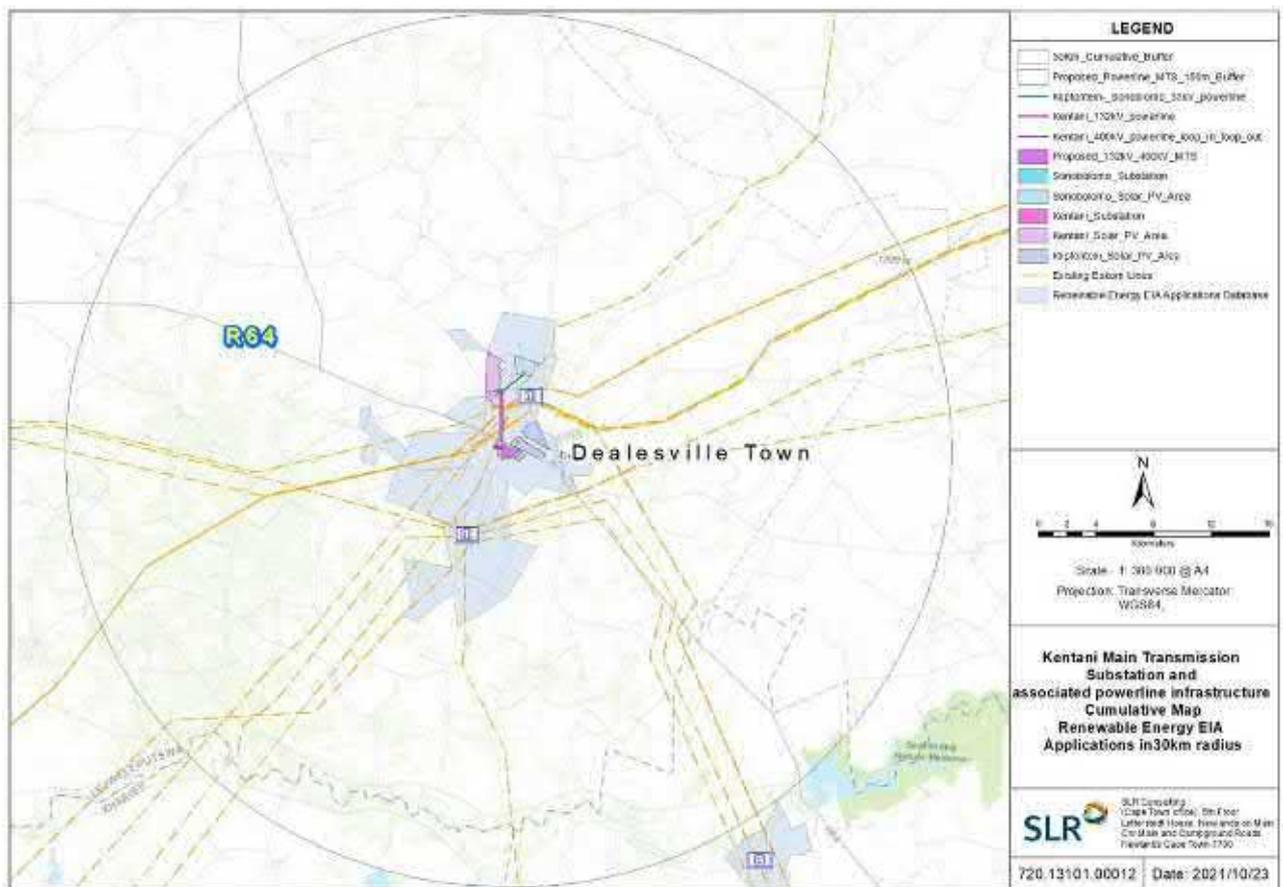


Figure 0-7: Cumulative Map indicating REFs within the 30km buffer of the proposed MTS and Powerlines (including Powerline Corridors)

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 Low Negative.

8 MITIGATION AND EMPR REQUIREMENTS

The overall geology of the area is uniform with only the Quaternary sediments, Jurassic dolerite, and the Tierberg Formation of the Ecca Group (Karoo Supergroup) represented. The proposed powerline is primarily 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 the Tierberg Formation is High.

As mitigation a Chance Find Protocol is added to the report.

8.1.1 *Chance Find Protocol*

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

8.1.2 *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.

8.1.3 *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.

8.1.4 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.

8.1.5 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.

9 CONCLUSION AND SUMMARY

9.1 Summary of Findings

The proposed 33kV powerline is primarily 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 the Tierberg Formation is High (Almond and Pether, 2009; Almond *et al.*, 2013)

A site-specific field survey of the proposed 33kV powerline was conducted on foot and by motor vehicle on 11 September 2021 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 33kV powerline 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.

10 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 33kV powerline, 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.

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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
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Research Assistant	National Museum, Bloemfontein 1993 – 1997
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TECHNICAL REPORTS

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Terrestrial Ecology and Plant Theme

Site Sensitivity Verification

Kentani MTS and associated infrastructure near Dealesville in the Free State Province



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Site Sensitivity Verification Report for the Kentani MTS and associated infrastructure near Dealesville in the Free State Province.

Location:
Near Dealesville in the Tokologo Local Municipality

For: SLR Consulting (Pty) Ltd (South Africa)

14 November 2021

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SPECIALIST DETAILS & DECLARATION

This report has been prepared in accordance with Section 13: General Requirements for Environmental Assessment Practitioners (EAPs) and Specialists as well as per Appendix 6 of GNR 982 – Environmental Impact Assessment Regulations and the National Environmental Management Act (NEMA, No. 107 of 1998 as amended 2017) and Government Notice 704 (GN 704). It has been prepared independently of influence or prejudice by any parties.

The details of Specialists are as follows –

Table 1: Details of Specialist

Specialist	Qualification accreditation	and Client	Signature
Dr David Hoare (Pr.Sci.Nat.)	PhD Botany	SLR	 Date: 14/11/2021

Details of Author:

Dr David Hoare

PhD (Botany) – Nelson Mandela Metropolitan University, Port Elizabeth

Main areas of specialisation

- Vegetation and general ecology (grasslands, savanna, Albany thicket, fynbos, coastal systems, wetlands).
- Plant biodiversity and threatened plant species specialist.
- Alien plant identification and control / management plans.
- Remote sensing, analysis and mapping of vegetation.
- Specialist consultant for environmental management projects.

Professional Natural Scientist, South African Council for Natural Scientific Professions, Reg. no. 400221/05 (Ecology, Botany)

Member, International Association of Vegetation Scientists (IAVS)

Member, Ecological Society of America (ESA)

Member, International Association for Impact Assessment (IAIA)

Member, Herpetological Association of Africa (HAA)

Employment history

- 1 December 2004 – present, Director, David Hoare Consulting (Pty) Ltd. Consultant, specialist consultant contracted to various companies and organisations.
- 1 January 2009 – 30 June 2009, Lecturer, University of Pretoria, Botany Dept.
- 1 January 2013 – 30 June 2013, Lecturer, University of Pretoria, Botany Dept.
- 1 February 1998 – 30 November 2004, Researcher, Agricultural Research Council, Range and Forage Institute, Private Bag X05, Lynn East, 0039. Duties: project management, general vegetation ecology, remote sensing image processing.

Declaration of independence:

David Hoare Consulting (Pty) Ltd in an independent consultant and hereby declare that it does not have any financial or other vested interest in the undertaking of the proposed activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act 107 of 1998). In addition, remuneration for services provided by David Hoare Consulting (Pty) Ltd is not subjected to or based on approval of the proposed project by the relevant authorities responsible for authorising this proposed project.

Disclosure:

David Hoare Consulting (Pty) Ltd undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and will provide the competent authority with access to all information at its disposal regarding the application, whether such information is favourable to the applicant or not.

Based on information provided to David Hoare Consulting (Pty) Ltd by the client and in addition to information obtained during the course of this study, David Hoare Consulting (Pty) Ltd present the results and conclusion within the associated document to the best of the author's professional judgement and in accordance with best practise.



Dr David Hoare

14 November 2021

Date

TERMS OF REFERENCE

This site sensitivity assessment follows the requirements of The Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in GN. No. 320 dated 20 March 2020. This states that prior to commencing with a specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration identified by the national web based environmental screening tool must be confirmed.

1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.
2. The site sensitivity verification must be undertaken through the use of:
 - a. a desktop analysis, using satellite imagery;
 - b. a preliminary on-site inspection; and
 - c. any other available and relevant information.
3. The outcome of the site sensitivity verification must be recorded in the form of a report that:
 - a. confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.;
 - b. contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and
 - c. is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations (EIA Regulations).

The compliance statement must contain, as a minimum, the following information:

- o contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;
- o a signed statement of independence by the specialist;
- o a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
- o a baseline profile description of biodiversity and ecosystems of the site;
- o the methodology used to verify the sensitivities of the terrestrial biodiversity and plant species features on the site including the equipment and modelling used where relevant;
- o in the case of a linear activity, confirmation from the terrestrial biodiversity specialist that, in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;
- o where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr;
- o a description of the assumptions made as well as any uncertainties or gaps in knowledge or data; and
- o any conditions to which this statement is subjected.
- o A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

INTRODUCTION

Project Background

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing the development of (1) Main Transmission Substation (MTS) and three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines), Li-Ion Battery Energy Storage System, the associated electrical infrastructure, (the 'proposed development') that will connect to the authorised Solar Energy Facilities i.e. Kentani, Klipfontein, Klipfontein 2, Leliehoek, Sonoblomo, Braklaagte, Boschrand 2, Meeding, Irene and Braambosch, collectively known as the Kentani Cluster located near the town of Dealesville, Tokologo Local Municipality (Lejweleputswa District) in the Free State Province. The proposed development will also involve the re-routing of eight (8) 132kV powerlines within the grid connection corridor which has been authorised as part of the Kentani Cluster, making provision for this routing in the new proposed MTS (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

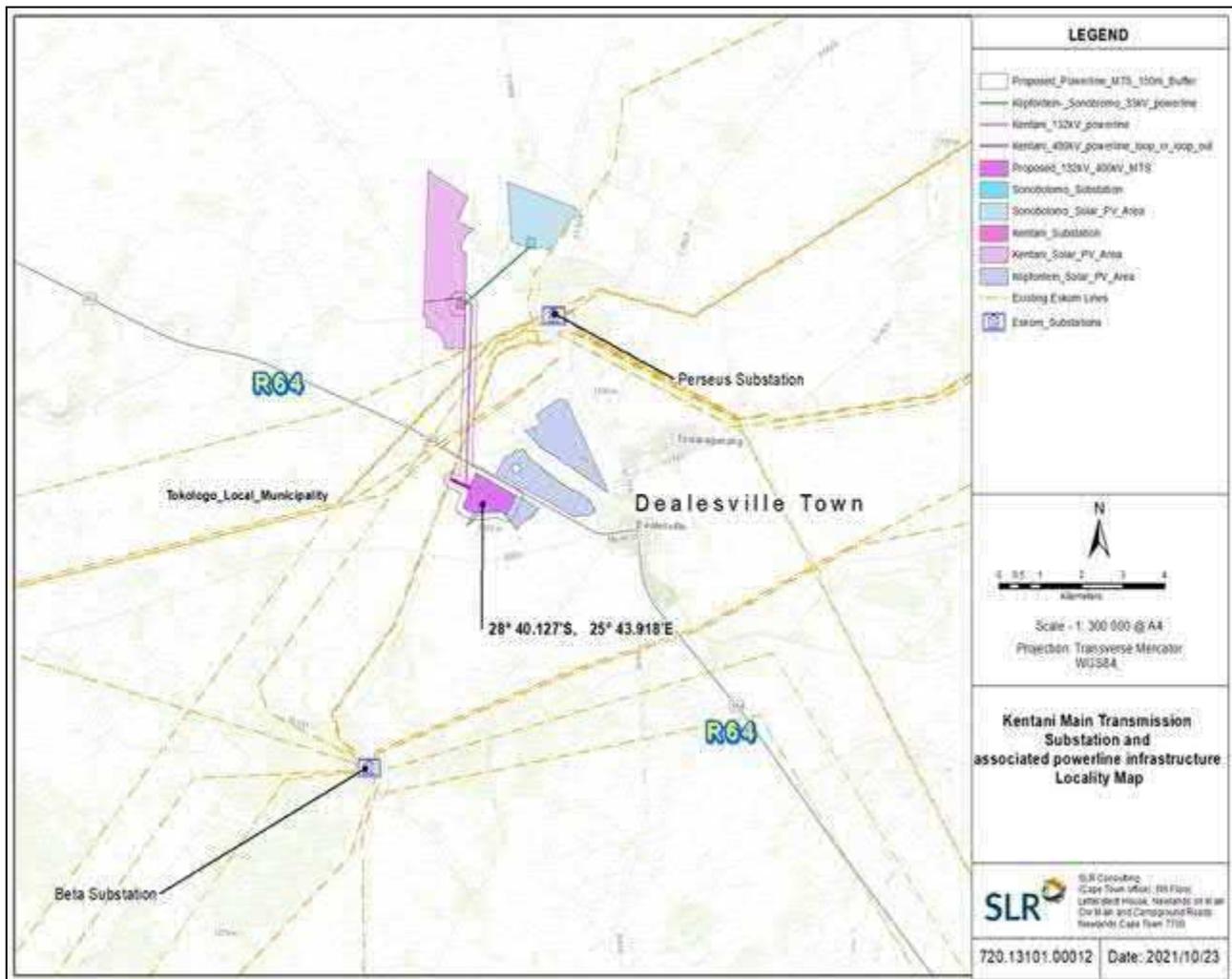


Figure 1: Location of proposed Main Transmission Substation (MTS) and associated electrical infrastructure (including grid connection corridors).

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

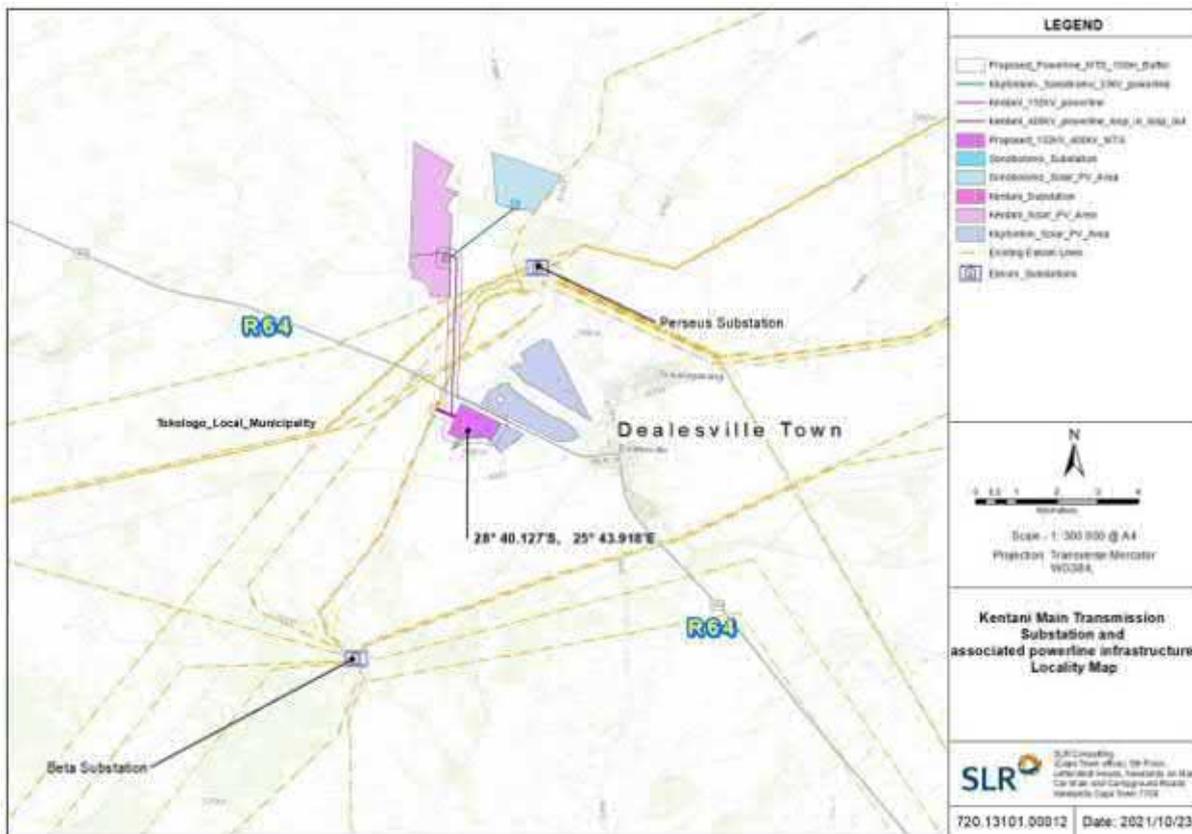


Figure 1: Locality Map of the proposed Main Transmission Substation (MTS) and associated electrical infrastructure (including grid connection corridors)

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)]. 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), which is proposed on the Remaining Extent of the Farm Klipfontein No. 305 (SG Code: F0040000000030500000). Of the eleven (11) powerlines, eight (8) are 132kV powerlines which are located within the authorised corridor, and which have been included as part of the authorised solar PV developments. 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).

Considering the above, it is important to note that the location of the proposed MTS as well as the corridors being proposed for the powerlines 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 2016¹.

Moreover, the proposed MTS and powerlines are located within the Kimberly Renewable Energy Development Zone and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notices No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively. 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) will 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. 800m in length) are being proposed and will connect the proposed MTS to the existing Eskom 400kV powerline, located approximately 1km west of the proposed MTS site, via a Loop-In-Loop Out (LILO) connection; and
2. One (1) 132kV powerline (approx. 4km in length) is being proposed and 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.
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 Sonobloomo 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 not trigger the need for an Application for Environmental Authorisation, however, the powerline has been considered by the specialist team.

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.

As part of the BA process, powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the 400kV and 132kV powerlines. 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. In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations [4 December 2014, Government Notice (GN) R982, R983, R984 and R985, 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 Department of Forestry, Fisheries and the Environment (DFFE), prior to the commencement thereof. One (1) application for EA for the proposed development will be submitted to the DFFE, in the form of a BA process, in terms of the NEMA EIA Regulations of 2014 (as amended).

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).

In accordance with GN 320 and GN 1150 (20 March 2020)² of the NEMA EIA Regulations of 2014 (as amended), prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (i.e., Screening Tool). Mrs Elize Butler, as the Palaeontology Specialist, has been commissioned to verify the sensitivity of the 132kV/400kV Main Transmission Substation (MTS) and Associated Infrastructure project site under these specialist protocols.

Identified Theme Sensitivities

A sensitivity screening report from the DEA Online Screening Tool was requested in the application category: Utilities Infrastructure | Electricity | Generation | Renewable | Solar | PV. The DEA Screening Tool report for the area indicates the following ecological sensitivities:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Animal Species Theme			X	
Plant Species Theme				X
Terrestrial Biodiversity Theme	X			

Animal Species theme

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Aves- Neotis ludwigii

Plant Species theme

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
Low	Low Sensitivity

Terrestrial Biodiversity theme

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
Very High	Critical biodiversity area 1
Very High	Endangered Ecosystem

² GN 320 (20 March 2020): 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

SITE SENSITIVITY VERIFICATION METHODOLOGY

The detailed methodology followed as well as the sources of data and information used as part of this assessment is described below.

Approach

The study commenced as a desktop-study followed by a site-specific field study on 12 October 2021. The site is within the Grassland Biome with a peak rainfall season in summer, which occurs from November to April. The timing of the survey is therefore sub-optimal in terms of assessing the flora of the site. However, despite this limitation, the overall condition of the vegetation was possible to be determined with a high degree of confidence. In addition, the entire area was previously assessed as part of the environmental authorisation process for the Klipfontein PV facility, for which authorisation has already been obtained ([14/12/16/3/3/2/722](#)).

During the field survey, all major natural variation on site was assessed and select locations were traversed on foot. A hand-held Garmin GPSMap 64s was used to record a track within which observations were made. Digital photographs were taken of features and habitats on site, as well as of all plant species that were seen. All plant species recorded were uploaded to the iNaturalist website.

Aerial imagery from Google Earth was used to identify and assess habitats on site. Patterns identified from satellite imagery were verified on the ground. From this ground survey, as well as ad hoc observations on site, a checklist of plant species occurring on site was compiled. Digital photographs were taken at locations where features of interest were observed.

Species of conservation concern

There are two classes of species of concern for the site under investigation, (i) those listed by conservation authorities as being on a Red List and are therefore considered to be at risk of extinction, and (ii) those listed as protected according to National and/or Provincial legislation.

Red List plant species

Determining the conservation status of a species is required to identify those species that are at greatest risk of extinction and, therefore, in most need of conservation action. South Africa has adopted the International Union for Conservation of Nature (IUCN) Red List Categories and Criteria to provide an objective, rigorous, scientifically founded system to identify Red List species. A published list of the Red List species of South African plants (Raimondo *et al.*, 2009) contains a list of all species that are considered to be at risk of extinction. This list is updated regularly to take new information into account, but these are not published in book/paper format. Updated assessments are provided on the SANBI website (<http://redlist.sanbi.org/>). According to the website of the Red List of Southern African Plants (<http://redlist.sanbi.org/>), *the conservation status of plants indicated on the Red List of South African Plants Online represents the status of the species within South Africa's borders. This means that when a species is not endemic to South Africa, only the portion of the species population occurring within South Africa has been assessed. The global conservation status, which is a result of the assessment of the entire global range of a species, can be found on the*

International Union for the Conservation of Nature (IUCN) Red List of Threatened Species: <http://www.iucnredlist.org>. The South African assessment is used in this study.

The purpose of listing Red List species is to provide information on the potential occurrence of species at risk of extinction in the study area that may be affected by the proposed infrastructure. Species appearing on these lists can then be assessed in terms of their habitat requirements to determine whether any of them have a likelihood of occurring in habitats that may be affected by the proposed infrastructure.

Lists were compiled specifically for any species at risk of extinction (Red List species) previously recorded in the area. Historical occurrences of threatened plant species were obtained from the South African National Biodiversity Institute (<http://posa.sanbi.org>) for the quarter degree square/s within which the study area is situated. Habitat information for each species was obtained from various published sources. The probability of finding any of these species was then assessed by comparing the habitat requirements with those habitats that were found, during the field survey of the site, to occur there.

Protected trees

Regulations published for the National Forests Act (Act 84 of 1998) (NFA) as amended, provide a list of protected tree species for South Africa. The species on this list were assessed in order to determine which protected tree species have a geographical distribution that coincides with the study area and habitat requirements that may be met by available habitat in the study area. The distribution of species on this list were obtained from published sources (e.g. van Wyk & van Wyk 1997) and from the SANBI Biodiversity Information System website (<http://sibis.sanbi.org/>) for quarter degree grids in which species have been previously recorded. Species that have been recorded anywhere in proximity to the site (within 100 km), or where it is considered possible that they could occur there, were listed and were considered as being at risk of occurring there.

Other protected species

National legislation was evaluated in order to provide lists of any plant or animal species that have protected status. The most important legislation is the following:

- National Environmental Management: Biodiversity Act (Act No 10 of 2004); and

This legislation contains lists of species that are protected. These lists were used to identify any species that have a geographical range that includes the study area and habitat requirements that are met by those found on site. These species were searched for within suitable habitats on site or, where relevant, if it is possible that they could occur on site, this was stated.

Red List animal species

Lists of threatened animal species that have a geographical range that includes the study area were obtained from literature sources (for example, Alexander & Marais 2007, Branch 1988, 2001, du Preez & Carruthers 2009, Friedmann & Daly 2004, Mills & Hes 1997, Monadjem *et al.*, 2010). The likelihood of any of them occurring was evaluated based on habitat preference and habitats available within the study area. The three parameters used to assess the probability of occurrence for each species were as follows:

- *Habitat requirements*: most Red Data animals have very specific habitat requirements and the presence of these habitat characteristics within the study area were assessed;
- *Habitat status*: in the event that available habitat is considered suitable for these species, the status or ecological condition was assessed. Often, a high level of degradation of a specific habitat type will negate the potential presence of Red Data species (especially wetland-related habitats where water-quality plays a major role); and
- *Habitat linkage*: movement between areas used for breeding and feeding purposes forms an essential part of ecological existence of many species. The connectivity of the study area to these surrounding habitats and adequacy of these linkages are assessed for the ecological functioning Red Data species within the study area.

Mammal threat status is according to Child et al. (2016), reptile threat status is according to Bates et al. 2014, and amphibian threat status is according to Minter et al. (2004).

Species probability of occurrence

Some species of plants may be cryptic, difficult to find, rare, ephemeral or generally not easy to identify while undertaking a survey of a large area. An assessment of the possibility of these species occurring there was therefore provided. For all threatened or protected flora that occur in the general geographical area of the site, a rating of the likelihood of it occurring on site is given as follows:

- **LOW:** no suitable habitats occur on site / habitats on site do not match habitat description for species;
- **MEDIUM:** habitats on site match general habitat description for species (e.g. karoo shrubland), but detailed microhabitat requirements (e.g. mountain shrubland on shallow soils overlying sandstone) are absent on the site or are unknown from the descriptions given in the literature or from the authorities;
- **HIGH:** habitats found on site match very strongly the general and microhabitat description for the species (e.g. mountain shrubland on shallow soils overlying sandstone);
- **DEFINITE:** species found in habitats on site.

Sources of information

Vegetation and plant species

- Broad vegetation types occurring on site were obtained from Mucina and Rutherford (2006), with updates according to the SANBI BGIS website (<http://bgis.sanbi.org>).
- The conservation status of the vegetation types were obtained from Mucina and Rutherford (2006) and the National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004).
- The plant species checklist of species that could potentially occur on site was compiled from a plant species checklist extracted from the NewPosa database of the South African National biodiversity Institute (SANBI) for the quarter degree grids 2821CA.
- The IUCN Red List Category for plant species, as well as supplementary information on habitats and distribution, was obtained from the SANBI Threatened Species Programme (Red List of South African Plants, <http://redlist.sanbi.org>).

Fauna

- Lists of animal species that have a geographical range that includes the study area were obtained from literature sources (Bates et al., 2014 for reptiles, du Preez & Carruthers 2009 for frogs, Mills & Hes 1997 and Friedmann and Daly, 2004 for mammals). This was supplemented with information from the Animal Demography Unit website (adu.uct.ac.za) and literature searches for specific animals, where necessary.

Regional plans

- Information from the National Protected Areas Expansion Strategy (NPAES) was consulted for possible inclusion of the site into a protected area in future (available on <http://bgis.sanbi.org>).
- The Free State Biodiversity Area Maps were consulted for inclusion of the site into a Critical Biodiversity Area or Ecological Support Area (biodiversityadvisor.sanbi.org).

OUTCOME OF THE SITE SENSITIVITY VERIFICATION

Broad vegetation patterns

There is one regional vegetation type in the study area, namely Vaal-vet sandy grassland (Figure 3). There are likely to be floristic and vegetation structural influences from any of this vegetation type at any location on site, depending on local ecological conditions. The vegetation type that occurs on site and nearby areas is briefly described below.

Vaal-vet Sandy Grassland (Gh10)

Distribution

North-West and Free State Provinces: South of Lichtenburg and Ventersdorp, stretching southwards to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort area north of Bloemfontein. Altitude 1 220–1 560 m, generally 1 260–1 360 m.

Vegetation & Landscape Features

Plains-dominated landscape with some scattered, slightly irregular undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element. Dominance of *Themeda triandra* is an important feature of this vegetation unit. Locally low cover of *T. triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall.

Geology & Soils

Aeolian and colluvial sand overlying sandstone, mudstone and shale of the Karoo Supergroup (mostly the Ecca Group) as well as older Ventersdorp Supergroup andesite and basement gneiss in the north. Soil forms are mostly Avalon, Westleigh and Clovelly. Dominant land type Bd, closely followed by Bc, Ae and Ba.

Climate

Warm-temperate, summer-rainfall climate, with overall MAP of 530 mm. High summer temperatures. Severe frost (37 days per year on average) occurs in winter. See also climate diagram for Gh 12 Vaal-Vet Sandy Grassland (Figure 8.23).

Important Taxa

Graminoids	<i>Antheophora pubescens</i> (d), <i>Aristida congesta</i> (d), <i>Chloris virgata</i> (d), <i>Cymbopogon caesius</i> (d), <i>Cynodon dactylon</i> (d), <i>Digitaria argyrograpta</i> (d), <i>Elionurus muticus</i> (d), <i>Eragrostis chloromelas</i> (d), <i>E. lehmanniana</i> (d), <i>E. plana</i> (d), <i>E. trichophora</i> (d), <i>Heteropogon contortus</i> (d), <i>Panicum gilvum</i> (d), <i>Setaria sphacelata</i> (d), <i>Themeda triandra</i> (d), <i>Tragus berteronianus</i> (d), <i>Brachiaria serrata</i> , <i>Cymbopogon pospischilii</i> , <i>Digitaria eriantha</i> , <i>Eragrostis curvula</i> , <i>E. obtusa</i> , <i>E. superba</i> , <i>Panicum coloratum</i> , <i>Pogonarthria squarrosa</i> , <i>Trichoneura grandiglumis</i> , <i>Triraphis andropogonoides</i> .
Herbs	<i>Stachys spathulata</i> (d), <i>Barleria macrostegia</i> , <i>Berkheya onopordifolia</i> var. <i>onopordifolia</i> , <i>Chamaesyce inaequilatera</i> , <i>Geigeria aspera</i> var. <i>aspera</i> , <i>Helichrysum caespititium</i> , <i>Hermannia depressa</i> , <i>Hibiscus pusillus</i> , <i>Monsonia burkeana</i> , <i>Rhynchosia adenodes</i> , <i>Selago densiflora</i> , <i>Vernonia oligocephala</i> .
Geophytic Herbs	<i>Bulbine narcissifolia</i> , <i>Ledebouria marginata</i> .
Succulent Herb	<i>Tripteris aghillana</i> var. <i>integrifolia</i> .

Low Shrubs	<i>Felicia muricata</i> (d), <i>Pentzia globosa</i> (d), <i>Anthospermum rigidum</i> subsp. <i>pumilum</i> , <i>Helichrysum dregeanum</i> , <i>H. paronychioides</i> , <i>Ziziphus zeyheriana</i> .
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Endemic Taxa

Herb	<i>Lessertia phillipsiana</i> .
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Conservation status of broad vegetation types

According to scientific literature (Driver *et al.*, 2005; Mucina *et al.*, 2006), as shown in Table 3, the vegetation type is listed as Endangered.

The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists national vegetation types that are afforded protection on the basis of rates of transformation. The thresholds for listing in this legislation are higher than in the scientific literature, which means there are fewer ecosystems listed in the National Ecosystem List versus in the scientific literature.



Figure 2: Critical Biodiversity Areas within the broad study area that includes the proposed infrastructure.

The vegetation type is listed in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011).

Table 2: Conservation status of different vegetation types occurring in the study area.

Vegetation Type		Conservation status		
		Driver <i>et al.</i> 2005; Mucina <i>et al.</i> , 2006	National Ecosystem List (NEM:BA)	
Vaal-vet Grassland	Sandy	Endangered	Endangered	

It is therefore verified that the site occurs within an Endangered Ecosystem, as listed in The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011) and therefore has VERY HIGH sensitivity from a Terrestrial Biodiversity perspective.

Parts of the site are natural grassland and other parts are secondary grassland in previously cultivated areas. On the basis of historical aerial imagery, confirmed in the field, the previously cultivated areas have a well-established secondary growth that structurally resembles the original grassland, although it is poorer in species composition and diversity. The primary grasslands have higher biodiversity value, but the secondary grasslands are of lower value.

Biodiversity Conservation Plans

The Free State CBA map classifies the natural vegetation of the province according to conservation value in decreasing value, as follows:

1. Protected
2. Critical Biodiversity Area One (Irreplaceable Areas) (RED)
3. Critical Biodiversity Area Two (Important Areas) (ORANGE)
4. Ecological Support Area (GREEN)
5. Other Natural Area (YELLOW)

This shows features within the study area within one of these classes, as follows:

1. CBA1 Areas: The northern parts of the grid corridor (see Figure 2).

This verifies the output from the Online Screening Tool in concept and spatial placement and confirms that parts of the site have VERY HIGH sensitivity from a Terrestrial Biodiversity perspective.

As discussed in the previous section, parts of the study area are previously cultivated. However, the location of these previously cultivated areas has been taken into account in assigning habitats to Critical Biodiversity Areas. Those areas that have been previously cultivated have very little overlap with areas assigned to CBA1 areas (see Figure 3).

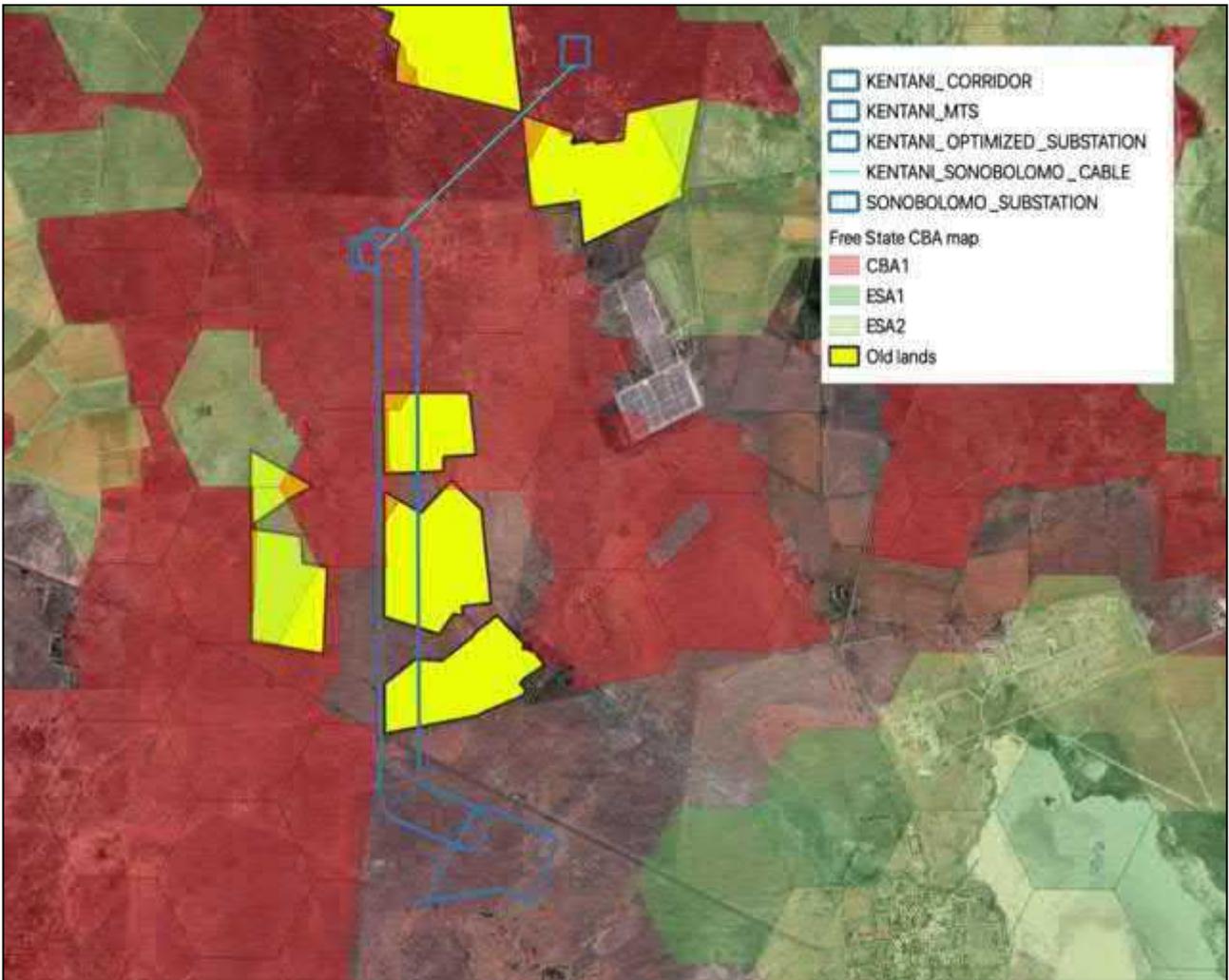


Figure 3: Previously cultivated areas in proximity to Critical Biodiversity Areas within the broad study area that includes the proposed infrastructure.

Red List plant species of the study area

Listed plant species previously recorded in the Free State were obtained from the South African National Biodiversity Institute (SANBI) website. These are listed in Appendix 2. There are seven threatened species on this list and a total of 35 species of conservation concern that occur in the Free State, but none of them have a geographical distribution that could include the site.

There are therefore no threatened, near threatened or rare species that occur in the study area. It is therefore verified that the Plant Species Theme has LOW sensitivity.

Table 3: Explanation of IUCN Version 3.1 categories (IUCN 2001) and Orange List categories (Victor & Keith 2004).

IUCN / Orange List category	Definition	Class
EX	Extinct	Extinct
CR	Critically Endangered	Red List
EN	Endangered	Red List
VU	Vulnerable	Red List
NT	Near Threatened	Orange List
Declining	Declining taxa	Orange List
Rare	Rare	Orange List
Critically Rare	Rare: only one subpopulation	Orange List
Rare-Sparse	Rare: widely distributed but rare	Orange List
DDD	Data Deficient: well known but not enough information for assessment	Orange List
DDT	Data Deficient: taxonomic problems	Data Deficient
DDX	Data Deficient: unknown species	Data Deficient

Animal species flagged for the study area

According to the National Web-Based Environmental Screening Tool, one animal species has been flagged as of concern for the current project, namely *Neotis ludwigii* (Ludwig's Bustard). This species is listed as Endangered on the basis that the population has undergone a rapid population decline, attributed to collisions with power lines (Birdlife International 2021).

Neotis ludwigii occurs in the flat, open, semi-arid shrublands of the Succulent Karoo, Nama Karoo, and western grasslands of the Free State and Eastern Cape. The site is within a known high density distribution region for the species (Taylor et al. 2015). It may also occur within cultivated fields and pastures. The site has a combination of natural and secondary grassland and is therefore suitable habitat for the species. Although not seen on site during the field survey, the habitat on site is considered to be suitable for the species. It is therefore assumed that it could occur there and that individuals of the species are therefore vulnerable to impacts from the project, especially collisions with overhead power lines.

It is therefore verified that the Animal Species Theme has MEDIUM sensitivity.

CONCLUSION

Desktop information, field data collection and mapping from aerial imagery confirms patterns provided in the DEA Online Screening Tool for various themes.

1. The study area occurs within an Endangered Ecosystem, namely Vaal-Vet Sandy Grassland. This verifies the VERY HIGH sensitivity for the Terrestrial Biodiversity Theme for those parts that are still in a natural state. Those areas that are degraded or secondary are not representative of the listed ecosystem and have LOW sensitivity.
2. Parts of the study area occur within Critical Biodiversity Area 1 in the Free State Conservation Plan. This verifies the VERY HIGH sensitivity for the Terrestrial Biodiversity Theme for parts of the powerline. Areas outside of the CBA1 area have LOW sensitivity for the Terrestrial Biodiversity Theme.
3. There are no plant species of concern that have a known distribution that includes the study area and none were seen on site. This verifies the LOW sensitivity for the Plant Species Theme.
4. The site has habitat that is suitable for the Endangered Ludwig's Bustard (*Neotis ludwigii*). This verifies the MEDIUM sensitivity for the Animal Species Theme (see Avifauna Report in BA appendices).

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APPENDICES:

Appendix 1: Plant species recorded in the footprint area.

Albuca setosa
Aptosimum procumbens
Argemone ochroleuca
Aristida congesta
Asparagus suaveolens
Berkheya rigida
Chrysocoma ciliata
Cyperus cristatus
Diospyros lycioides
Ehretia rigida
Felicia muricata
Genus Anthospermum
Genus Dimorphotheca
Genus Eragrostis
Genus *Limeum*
Genus *Lycium*
Genus Senecio
Helichrysum argyrosphaerum
Helichrysum luteoalbum
Lasiosiphon polycephalus
Lopholaena coriifolia
Lotononis laxa
Macledium zeyheri
Melolobium candicans
Moraea pallida
Olea europaea
Order Phasmida
Ruschia hamata
Salvia verbenaca
Schoenoplectus muricinux
Searsia lancea
Selago densiflora
Solanum elaeagnifolium
Stigmochelys pardalis
Themeda triandra
Vachellia nilotica
Viscum rotundifolium
Ziziphus mucronata

Appendix 2: Listed plant species of Free State.

Alepidea cordifolia EN
Aloe dominella NT
Anemone fanninii NT
Argyrobium campicola NT
Brachystelma duplicatum Critically Rare
Brachystelma incanum VU
Calpurnia reflexa Rare
Crassula tuberella VU
Dioscorea sylvatica VU
Disa sankeyi Rare
Drimia sanguinea NT
Eucomis bicolor NT
Gladiolus robertsoniae NT
Helichrysum haygarthii Rare
Kniphofia ensifolia subsp. *autumnalis* EN
Lithops lesliei subsp. *lesliei* NT
Lithops salicola NT
Lotononis amajubica Rare
Merwillia plumbea NT
Nerine gracilis VU
Pentzia oppositifolia Rare
Pterygodium alticola Rare
Schizoglossum montanum Rare
Searsia dracomontana NT
Selaginella nubigena Rare
Syncolostemon macranthus NT
Zaluzianskya distans Rare



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Terrestrial Biodiversity Specialist Assessment

Kentani MTS and associated infrastructure near Dealesville in the Free State Province.

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For: SLR Consulting (Pty) Ltd (South Africa)

14 November 2021

EXECUTIVE SUMMARY

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing the development of (1) Main Transmission Substation (MTS) and three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines), Li-Ion Battery Energy Storage System, the associated electrical infrastructure, that will connect to the authorised Solar Energy Facilities i.e. Kentani, Klipfontein, Klipfontein 2, Leliehoek, Sonoblomo, Braklaagte, Boschrand 2, Meeding, Irene and Braambosch, collectively known as the Kentani Cluster located near the town of Dealesville, Tokologo Local Municipality (Lejweleputswa District) in the Free State Province. The site of the proposed development has been flagged in the Screening Report from the web-based Online Screening Tool as having Very High sensitivity for the Terrestrial Biodiversity Theme, which requires that a specialist assessment be undertaken. The assessment provided here is according to the required protocols.

The site is within a regional vegetation type called Vaal-Vet Sandy Grassland, which is listed as Endangered in the National List of Ecosystems that are Threatened and need of protection. However, not all parts of the site are in a natural state and the threatened categorisation only applies to remaining areas of natural habitat. Other parts of the site are degraded, cultivated, or are secondary grasslands in previously cultivated areas. These areas qualify as having Low sensitivity.

There is a Critical Biodiversity Area (CBA1) in the northern parts of the powerline corridor. These areas having Very High sensitivity. Areas outside of this CBA1 area are degraded or secondary and have Low sensitivity.

Key ecological drivers in dry grasslands are grazing, fire, rainfall, and biological invasions. The project could potentially lead to an increase of the last factor, but is unlikely to affect any of the other ecological drivers. Landscape alteration due to urban areas, cultivation, mining and utilities has led to historical loss of habitat over the geographical distribution range of the ecosystem. At a landscape scale, this can lead to fragmentation and patch isolation, which can disrupt a number of ecological processes. The nature of the project assessed here (primarily powerlines) is of a nature that these processes will not be affected in any significant way. The main anticipated impacts due to the project are therefore localised loss of small amounts of habitat in the footprint of pylons, as well as possible invasion by alien invasive plants. Both of these impacts were assessed as having medium significance before mitigation and low significance after mitigation. Cumulative impacts due to these factors is considered to be negligible.

The report concludes that, on the basis of the assessment undertaken here, which indicates two possible impacts that can be mitigated, it is considered appropriate that they project be given approval.

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SPECIALIST DETAILS & DECLARATION

This report has been prepared in accordance with Section 13: General Requirements for Environmental Assessment Practitioners (EAPs) and Specialists as well as per Appendix 6 of GNR 982 – Environmental Impact Assessment Regulations and the National Environmental Management Act (NEMA, No. 107 of 1998 as amended 2017) and Government Notice 704 (GN 704). It has been prepared independently of influence or prejudice by any parties.

The details of Specialists are as follows –

Table 1: Details of Specialist

Specialist	Qualification accreditation	and Client	Signature
Dr David Hoare (Pr.Sci.Nat.)	PhD Botany	SLR	 Date: 14/11/2021

Details of Author:

Dr David Hoare

PhD (Botany) – Nelson Mandela Metropolitan University, Port Elizabeth

Professional Natural Scientist, South African Council for Natural Scientific Professions, Reg. no. 400221/05 (Ecology, Botany)

Statement of independence:

I, David Hoare, as the appointed plant species specialist, hereby declare/affirm the correctness of the information provided in this compliance statement, and that I:

1. meet the general requirements to be independent and
2. have no business, financial, personal or other interest in the proposed development and that no circumstances have occurred that may have compromised my objectivity; and
3. am aware that a false declaration is an offence in terms of regulation 48 of the EIA Regulations (2014).



Dr David Hoare

14 November 2021
Date

TERMS OF REFERENCE

Where the sensitivity in the Screening Report from the web-based Online Screening Tool has been confirmed to be VERY HIGH, a Terrestrial Biodiversity Specialist Assessment is required, for terrestrial biodiversity features.

The specialist assessment must be prepared by a SACNASP registered specialist with expertise in the field of terrestrial biodiversity.

The assessment must be undertaken on the preferred site and within the proposed development footprint.

The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:

- a description of the ecological drivers or processes of the system and how the proposed development will impact these;
- ecological functioning and ecological processes (e.g. fire, migration, pollination, etc.) that operate within the preferred site;
- the ecological corridors that the proposed development would impede including migration and movement of flora and fauna;
- the description of any significant terrestrial landscape features (including rare or important flora-faunal associations, presence of strategic water source areas (SWSAs) or freshwater ecosystem priority area (FEPA) sub catchments);
- a description of terrestrial biodiversity and ecosystems on the preferred site, including:
 - main vegetation types;
 - threatened ecosystems, including listed ecosystems as well as locally important habitat types identified;
 - ecological connectivity, habitat fragmentation, ecological processes and fine- scale habitats; and
 - species, distribution, important habitats (e.g. feeding grounds, nesting sites, etc.) and movement patterns identified;
- the assessment must identify any alternative development footprints within the preferred site which would be of a “low” sensitivity as identified by the screening tool and verified through the site sensitivity verification; and
- the assessment must be based on the results of a site inspection undertaken on the preferred site and must identify:
 - terrestrial critical biodiversity areas (CBAs), including:
 - i. the reasons why an area has been identified as a CBA;
 - ii. an indication of whether or not the proposed development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation;
 - iii. the impact on species composition and structure of vegetation with an indication of the extent of clearing activities in proportion to the remaining extent of the ecosystem type(s);
 - iv. the impact on ecosystem threat status;
 - v. the impact on explicit subtypes in the vegetation;
 - vi. the impact on overall species and ecosystem diversity of the site; and
 - vii. the impact on any changes to threat status of populations of species of conservation concern in the CBA;
 - terrestrial ecological support areas (ESAs), including:
 - i. the impact on the ecological processes that operate within or across the site;

- ii. the extent the proposed development will impact on the functionality of the ESA; and
 - iii. loss of ecological connectivity (on site, and in relation to the broader landscape) due to the degradation and severing of ecological corridors or introducing barriers that impede migration and movement of flora and fauna;
- protected areas as defined by the National Environmental Management: Protected Areas Act, 2004 including-
 - i. an opinion on whether the proposed development aligns with the objectives or purpose of the protected area and the zoning as per the protected area management plan;
- priority areas for protected area expansion, including-
 - i. (a) the way in which the proposed development will compromise or contribute to the expansion of the protected area network;
- SWSAs including:
 - ii. (a) the impact(s) on the terrestrial habitat of a SWSA; and
 - iii. (b) the impacts of the proposed development on the SWSA water quality and quantity (e.g. describing potential increased runoff leading to increased sediment load in water courses);
- FEPA subcatchments, including-
 - i. (a) the impact of the proposed development on habitat condition and species in the FEPA sub catchment;
 - ii. species in the FEPA sub catchment;
- indigenous forests, including:
 - i. (a) impact on the ecological integrity of the forest; and
 - ii. (b) percentage of natural or near natural indigenous forest area lost and a statement on the implications in relation to the remaining areas.

The findings of the assessment must be written up in a Terrestrial Biodiversity Specialist Assessment Report, which must contain, as a minimum, the following information:

- contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;
- a signed statement of independence by the specialist;
- a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
- a description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;
- a description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;
- a location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);
- additional environmental impacts expected from the proposed development;
- any direct, indirect and cumulative impacts of the proposed development;
- the degree to which impacts and risks can be mitigated;
- the degree to which the impacts and risks can be reversed;
- the degree to which the impacts and risks can cause loss of irreplaceable resources;
- proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);
- a motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a “low” terrestrial biodiversity sensitivity and that were not considered appropriate;

- a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and
- any conditions to which this statement is subjected.

The findings of the Terrestrial Biodiversity Specialist Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr where relevant.

A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

INTRODUCTION

Project Background

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing the development of (1) Main Transmission Substation (MTS) and three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines), Li-Ion Battery Energy Storage System, the associated electrical infrastructure, (the 'proposed development') that will connect to the authorised Solar Energy Facilities i.e. Kentani, Klipfontein, Klipfontein 2, Leliehoek, Sonoblomo, Braklaagte, Boschrand 2, Meeding, Irene and Braambosch, collectively known as the Kentani Cluster located near the town of Dealesville, Tokologo Local Municipality (Lejweleputswa District) in the Free State Province. The proposed development will also involve the re-routing of eight (8) 132kV powerlines within the grid connection corridor which has been authorised as part of the Kentani Cluster, making provision for this routing in the new proposed MTS (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

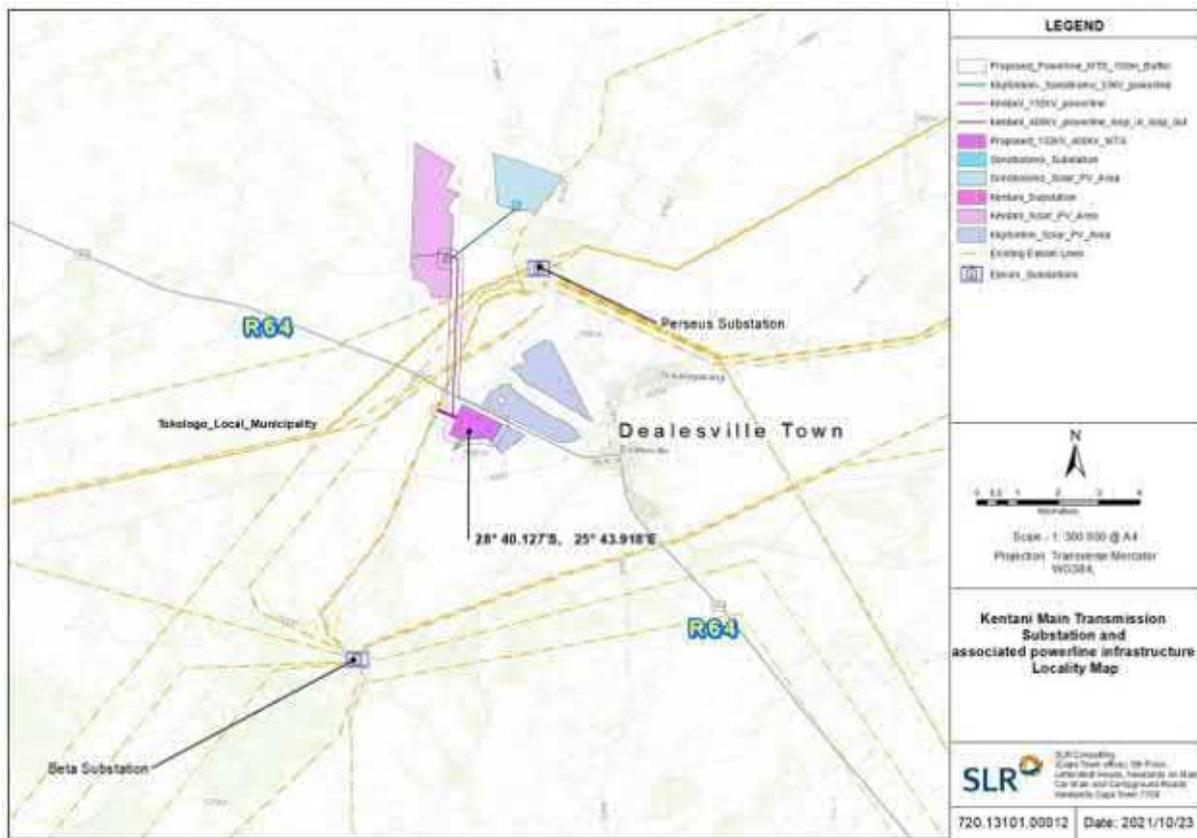


Figure 1: Locality Map of the proposed Main Transmission Substation (MTS) and associated electrical infrastructure (including grid connection corridors)

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)]. 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), which is proposed on the Remaining Extent of the Farm Klipfontein No. 305 (SG Code: F0040000000030500000). Of the eleven (11) powerlines, eight (8) are 132kV powerlines which are located within the authorised corridor, and which have been included as part of the authorised solar PV developments. 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).

Considering the above, it is important to note that the location of the proposed MTS as well as the corridors being proposed for the powerlines 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.

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).

Moreover, the proposed MTS and powerlines are located within the Kimberly Renewable Energy Development Zone and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notices No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively. 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) will 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. 800m in length) are being proposed and will connect the proposed MTS to the existing Eskom 400kV powerline, located approximately 1km west of the proposed MTS site, via a Loop-In-Loop Out (LILO) connection; and
2. One (1) 132kV powerline (approx. 4km in length) is being proposed and 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.
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 Sonobloomo 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 not trigger the need for an Application for Environmental Authorisation, however, the powerline has been considered by the specialist team.

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.

As part of the BA process, powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the 400kV and 132kV powerlines. 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. In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations [4 December 2014, Government Notice (GN) R982, R983, R984 and R985, 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 Department of Forestry, Fisheries and the Environment (DFFE), prior to the commencement thereof. One (1) application for EA for the proposed development will be submitted to the DFFE, in the form of a BA process, in terms of the NEMA EIA Regulations of 2014 (as amended).

In accordance with GN 320 and GN 1150 (20 March 2020)² of the NEMA EIA Regulations of 2014 (as amended), prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (i.e., Screening Tool). Mrs Elize Butler, as the Palaeontology Specialist, has been commissioned to verify the sensitivity of the 132kV/400kV Main Transmission Substation (MTS) and Associated Infrastructure project site under these specialist protocols.

Identified Theme Sensitivity

A sensitivity screening report from the DEA Online Screening Tool was requested in the application category: Utilities Infrastructure | Electricity | Generation | Renewable | Solar | PV. The DEA Screening Tool report for the area indicates the following ecological sensitivities:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Terrestrial Biodiversity Theme	X			

Terrestrial Biodiversity theme

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
Very High	Critical biodiversity area 1
Very High	Endangered Ecosystem

² GN 320 (20 March 2020): 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

PROJECT DESCRIPTION

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 Figure 1). The proposed project will be located on the following properties / farm portions (Figure 2):

- Remaining Extent of the Farm Klipfontein No. 305 (F0040000000030500000);
- The Farm Leliehoek No. 748 (F00400000000074800000);
- Remainder of the Farm Oxford No. 1030 (F00400000000103000000);
- Portion 1 of the Farm Walkerville No. 1031 (F00400000000103100001)³; and
- Remainder of the Farm Walkerville No. 1031 (F00400000000103100000).
- The Farm Overshot No. 31 (F00400000000003100000)

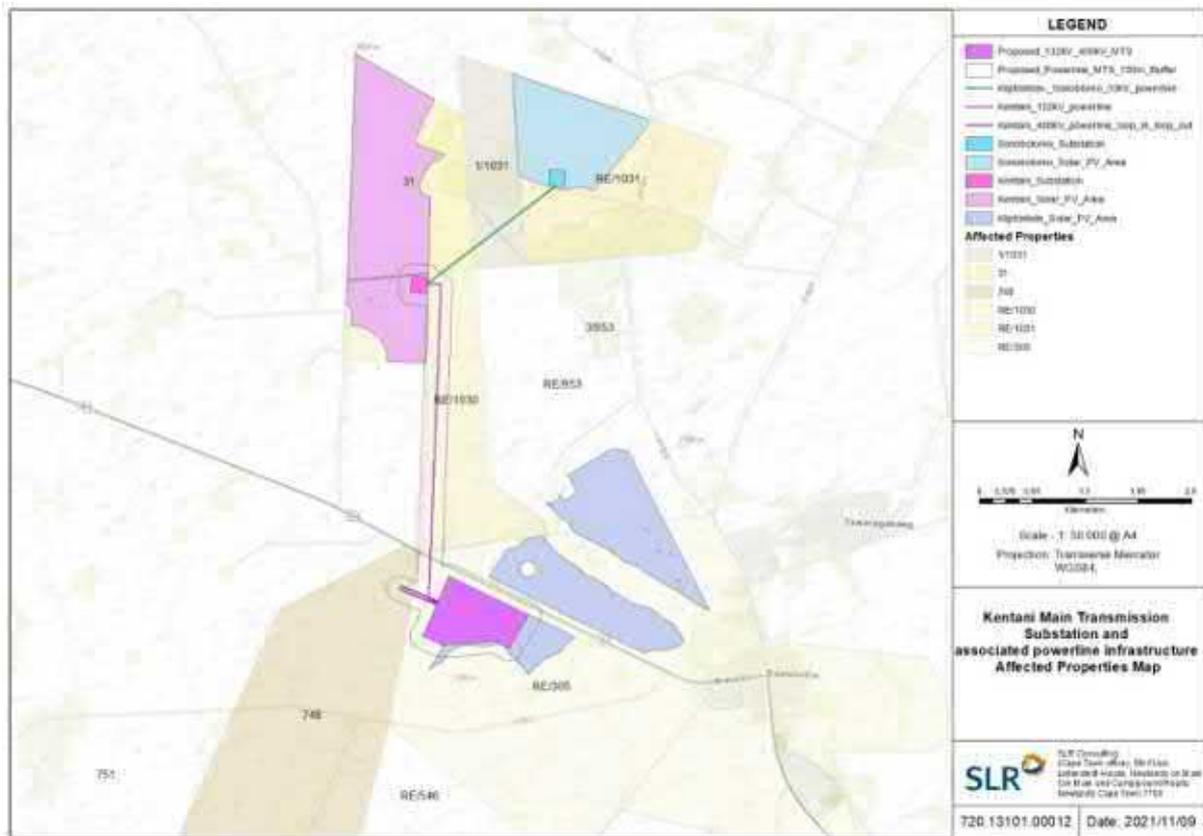


Figure 2: Affected Properties Map

³ 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.

The proposed MTS, BESS and powerlines are located within the within the Kimberly Renewable Energy Development Zone (REDZ)⁴ 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 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 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.

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) will 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

⁴ GN R 786 of 2020: Notice of Identification in Terms of Section 24(5)(a) and (b) of 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.

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 Sonobloomo 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 not 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.

The Table below represents these various project components and their specifications. The location of these components in relation to the project site is shown on Figure 3.

Table 1: Summary of the key project components

Project Components	Location and size / extent (i.e., Farm Names and Areas)
Location	<ul style="list-style-type: none"> • 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 - F00400000000103100001³ • Remainder of the Farm Walkerville No. 1031 - F00400000000103100000³ • The Farm Overschot No. 31 - F0040000000003100000
Onsite Main Transmission Substation (MTS)	<ul style="list-style-type: none"> • 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 2016¹) 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 (<u>14/12/16/3/3/2/722</u>), which is proposed on Remaining Extent of the Farm Klipfontein No. 305
Grid Connection (Powerlines)	<ul style="list-style-type: none"> • 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 (<u>14/12/16/3/3/2/724</u>) (approx. 4km north-west of MTS site); • One (1) new 33kV overhead powerline connecting authorised 75MW Sonoblomo PV facility (<u>14/12/16/3/3/2/723</u>) (approx. 5km north of MTS site) to authorised Kentani on-site substation (<u>14/12/16/3/3/2/724</u>) (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	<ul style="list-style-type: none"> • One (1) new road in servitude under proposed powerlines • One (1) new access to the R64 provincial route

	<ul style="list-style-type: none">• Widths of up to approx. 4-8m
BESS	<ul style="list-style-type: none">• Li-Ion Battery Energy Storage System up to 4 ha in extent within the assessed site foot print

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:

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.

The site layout being proposed is shown in the figure below

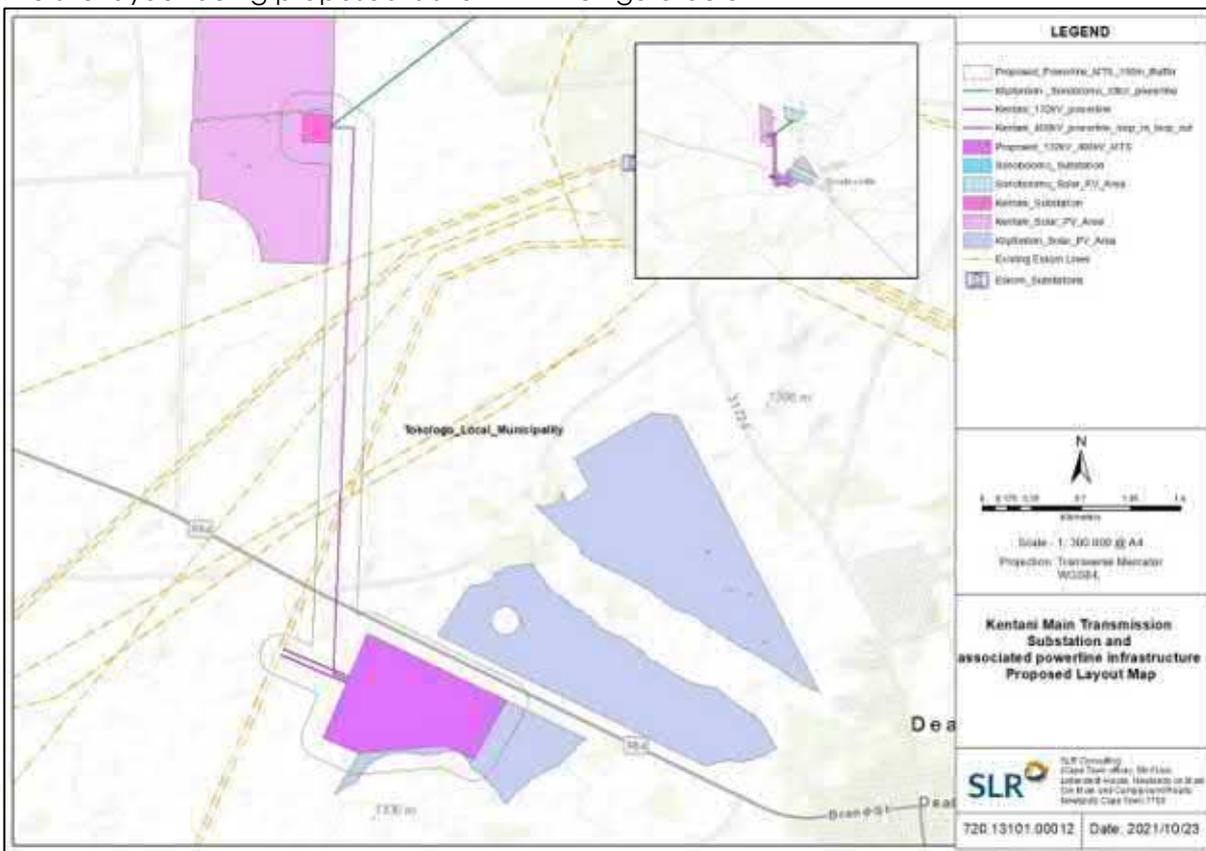


Figure 3: Proposed layout

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.

METHODOLOGY

The detailed methodology followed as well as the sources of data and information used as part of this assessment is described below.

Survey timing

The study commenced as a desktop-study followed by a site-specific field study on 12 October 2021. The site is within the Grassland Biome with a peak rainfall season in summer, which occurs from November to April. The timing of the survey is therefore sub-optimal in terms of assessing the flora of the site, although significant rainfall had fallen prior to the site visit. However, despite this limitation, the overall condition of the vegetation was possible to be determined with a high degree of confidence. In addition, the entire area was previously assessed as part of the environmental authorisation process for the Klipfontein PV facility, for which authorisation has already been obtained ([14/12/16/3/3/2/722](#)) and for which the original specialist study was made available.

Field survey approach

During the field survey, all major natural variation on site was assessed and select locations were traversed on foot. A hand-held Garmin GPSMap 64s was used to record a track within which observations were made.

Aerial imagery from Google Earth was used to identify and assess habitats on site. Patterns identified from satellite imagery were verified on the ground. During the field survey, particular attention was paid to ensuring that all habitat variability was covered physically on the ground.

Digital photographs were taken of features of interest that were seen on site, as well as of habitat in different parts of the site.

Sources of information

Plant species

- Broad vegetation types occurring on site were obtained from Mucina and Rutherford (2006), with updates according to the SANBI BGIS website (<http://bgis.sanbi.org>).
- Information from the National Protected Areas Expansion Strategy (NPAES) was consulted for possible inclusion of the site into a protected area in future (available on <http://bgis.sanbi.org>).
- The Free State Biodiversity Area Maps were consulted for inclusion of the site into a Critical Biodiversity Area or Ecological Support Area (biodiversityadvisor.sanbi.org).
- Mapping was done from aerial imagery on Google Earth, which also provides historical imagery for a period up to 15 years ago.

Impact assessment methodology

The criteria used to assess both the impacts and the method of determining the significance of the impacts is outlined in Table 3. This method complies with the method provided in the EIA guideline document (GN 654 of 2010). **Part A** provides the definitions of the criteria and the approach for determining impact consequence (combining intensity, extent and duration). In **Part B**, a matrix is applied to determine this impact consequence. In **Part C**, the consequence rating is considered together with the probability of occurrence in order to determine the overall significance of each impact. Lastly, the interpretation of the impact significance is provided in **Part D**.

Table 3: 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.

A comment is provided, as follows, on the degree to which the impact:

1. Can be reversed;
2. May cause irreplaceable loss of resources; and
3. Can be avoided, managed or mitigated.

CUMULATIVE ASSESSMENT

A cumulative impact can be defined as *“the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that itself may not be significant, but may be significant when added to the existing and foreseeable impacts culminating from similar or diverse activities”* (NEMA EIA Reg GN R982 of 2014).

The South African Renewable Energy EIA Application Database (REEA) available at the time (namely “REEA_OR_2021_Q2”) shows 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 time⁵, 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](#)

⁵ 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 Watt PV solar projects and associated infrastructure - [14/12/16/3/3/2/854](#)
- 100 MW Faraday PV solar projects and associated infrastructure - [14/12/16/3/3/2/855](#)
- 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](#)

There are therefore a number of renewable energy applications for EA either approved or being proposed within a 30km radius of the proposed project site. 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.

There are however no operational renewable energy developments situated within a 30km radius of the proposed project site to the knowledge of the EAP. The cumulative impact assessed will therefore be the collective impact of the proposed MTS, BESS and powerline application along with the other renewable energy development applications (either approved or being proposed) mentioned above which are located within a 30km radius of the project site.

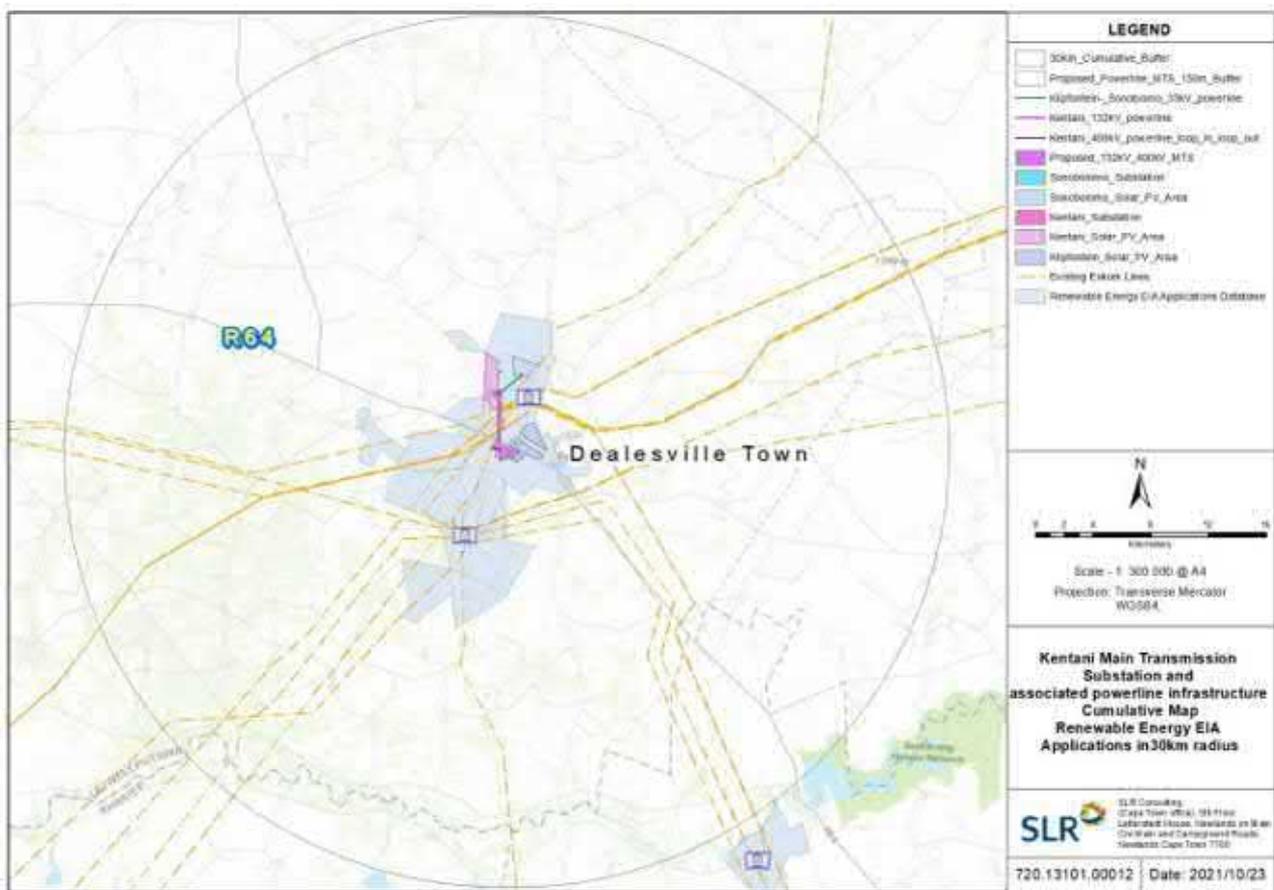


Figure 4: Cumulative Map indicating REFs within the 30km buffer of the proposed MTS and Powerlines (including Powerline Corridors)

Assessment of Alternatives

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, technology, or powerline corridor alternatives will be assessed.

Additionally, the proposed MTS and associated infrastructure will be located within the authorised Klipfontein PV facility (14/12/16/3/3/2/722), and as such the location of the proposed MTS has previously been assessed as part of the development footprint for the Klipfontein PV project. Eight (8) 132kV powerlines are also located within the authorised corridor included as part of the authorised Kentani Cluster and thus the location of the corridors being proposed have also previously been assessed as part of the development footprint for the Kentani Cluster of solar PV developments.

The site proposed for the MTS, BESS and respective grid connection corridors will however each be assessed against the 'no-go' alternative. The 'no-go' alternative is the option of not constructing the Project and where the *status quo* of the current status and/or activities on the site would prevail.

RESULTS

Broad vegetation patterns

There is one regional vegetation type in the study area, namely Vaal-vet sandy grassland, briefly described below, including expected species composition.

Vaal-vet Sandy Grassland (Gh10)

Distribution

North-West and Free State Provinces: South of Lichtenburg and Ventersdorp, stretching southwards to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort area north of Bloemfontein. Altitude 1 220–1 560 m, generally 1 260–1 360 m.

Vegetation & Landscape Features

Plains-dominated landscape with some scattered, slightly irregular undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element. Dominance of *Themeda triandra* is an important feature of this vegetation unit. Locally low cover of *T. triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall.

Important Taxa

Graminoids	<i>Antheophora pubescens</i> (d), <i>Aristida congesta</i> (d), <i>Chloris virgata</i> (d), <i>Cymbopogon caesius</i> (d), <i>Cynodon dactylon</i> (d), <i>Digitaria argyrograpta</i> (d), <i>Elionurus muticus</i> (d), <i>Eragrostis chloromelas</i> (d), <i>E. lehmanniana</i> (d), <i>E. plana</i> (d), <i>E. trichophora</i> (d), <i>Heteropogon contortus</i> (d), <i>Panicum gilvum</i> (d), <i>Setaria sphacelata</i> (d), <i>Themeda triandra</i> (d), <i>Tragus berteronianus</i> (d), <i>Brachiaria serrata</i> , <i>Cymbopogon pospischilii</i> , <i>Digitaria eriantha</i> , <i>Eragrostis curvula</i> , <i>E. obtusa</i> , <i>E. superba</i> , <i>Panicum coloratum</i> , <i>Pogonarthria squarrosa</i> , <i>Trichoneura grandiglumis</i> , <i>Triraphis andropogonoides</i> .
Herbs	<i>Stachys spathulata</i> (d), <i>Barleria macrostegia</i> , <i>Berkheya onopordifolia</i> var. <i>onopordifolia</i> , <i>Chamaesyce inaequilatera</i> , <i>Geigeria aspera</i> var. <i>aspera</i> , <i>Helichrysum caespititium</i> , <i>Hermannia depressa</i> , <i>Hibiscus pusillus</i> , <i>Monsonia burkeana</i> , <i>Rhynchosia adenodes</i> , <i>Selago densiflora</i> , <i>Vernonia oligocephala</i> .
Geophytic Herbs	<i>Bulbine narcissifolia</i> , <i>Ledebouria marginata</i> .
Succulent Herb	<i>Tripteris aghillana</i> var. <i>integrifolia</i> .
Low Shrubs	<i>Felicia muricata</i> (d), <i>Pentzia globosa</i> (d), <i>Anthospermum rigidum</i> subsp. <i>pumillum</i> , <i>Helichrysum dregeanum</i> , <i>H. paronychioides</i> , <i>Ziziphus zeyheriana</i> .
<u>Endemic Taxa</u>	
Herb	<i>Lessertia phillipsiana</i> .

Key ecological drivers

Vaal-Vet Sandy Grassland falls within the Dry Highveld Grassland Bioregion. Key environmental variables / ecosystem drivers in these all grasslands are the amount of rainfall, intensity and type of grazing, frequency and season of fire, soil nutrient status, and soil texture. Key threats are related to fire and grazing mismanagement, cultivation and transformation of grasslands, soil erosion, and invasion by alien invasive plants.

Dry Highveld Grasslands (including Vaal-Vet Sandy Grassland) occupy the central plateau of the country extending over much of the Free State, and into the North West Province, with smaller areas in the Eastern and Northern Cape as well as Gauteng. They occur at mid-altitudes of 1 300 -1 600 masl, where the topography is mostly flat to undulating, broken occasionally by rocky ridges, small outcropping mountains and river valleys (SANBI 2013). They are adapted to a temperate climate with 20 - 50 days of frost a year, and a strongly seasonal summer rainfall of 400 – 550 mm rainfall per annum. The underlying geology is dominated by sandstones and mudstones, giving rise to deep, red soils (). Dolerite sheets are associated with shallower, stony soils. In the west, including within the study area, shallow red sands occur over layers of calcrete (SANBI 2013). The underlying geology is an important determinant of biodiversity, with dolerite areas tending to give rise to ecologically sensitive plant communities with higher levels of local diversity.

The vegetation is dominated by semi-arid sweetveld that is drought-adapted. Plant growth and interactions are driven by environmental limitations (water) rather than competition (Hoare 2009). The plant species show a significant amount of reproduction from seed. Perennial plants persist vegetatively from year to year but new plants establish after droughts from dormant seeds. This dynamic will not be affected by the project.

Grazing is an important ecosystem driver. The unpredictable semi-arid climate, combined with nutrient- rich (unleached) soils, results in nutritious sweetveld (SANBI 2013). Although these grasslands are slow-growing (due to low rainfall), it can support animal production year-round, which means that it is vulnerable to over-grazing. Where over-grazing occurs, it shifts the plant species composition and structure from a forb-rich grassland to a grassy karroid dwarf shrubland. Healthy grassland in these areas has a high cover of palatable grass species, such as *Themeda triandra*, *Digitaria eriantha* and *Antheophora pubescens*, and few or no karroid shrubs. The proposed project will not affect the grazing status and regime of the area - it is expected that untransformed areas will continue to be grazed as currently.

Fire is not as important in these dryer grasslands as in other more moist grassland areas, and is also less of an ecological factor than grazing. Fuel loads take some time to build up and, because of the slower growth rates, the vegetation takes a longer time to recover from fire. The proposed project will not affect the fire regime of the area and it is expected that the land managers will continue to manage in the same way after construction as currently. The vegetation does not reach a stature that would require burning within the servitude in a different manner to the current regime.

Invasion by alien plant species is an important risk factor in these dry grasslands, as with any grassland area in South Africa. No major nodes of invasion were observed on site, but invasive species that could possibly become problematic due to local disturbance include the grasses, *Arundo donax*, *Pennisetum setaceum*, *Sorghum halepense*, the herbaceous species, *Argemone ochroleuca* (seen on site), *Cirsium vulgare*, *Datura ferox*, *Datura stramonium*, *Salsola kali*, *Solanum eleagnifolium*, *Xanthium spinosum*, *Xanthium strumarium*, the succulents, *Agave americana*, *Echinopsis spachiana*, *Opuntia aurantiaca*, *Opuntia ficus-indica*, *Opuntia fulgida*, *Opuntia humifusa*, *Opuntia imbricata*, *Opuntia spinulifera*, *Opuntia stricta*, and the shrubs / woody species, *Tamarix ramosissima*, *Gleditsia triacanthos*, ***Prosopis glandulosa***, *Robinia pseudoacacia*, *Atriplex nummularia*, *Cotoneaster* sp., *Nicotiana glauca*, *Populus x canescens*, *Ailantus altissima*, *Sesbania punicea*, and ***Melia azeradach***. Disturbance associated with construction is almost certain to provide opportunity to invasive species to colonise the site.

Loss of habitat and fragmentation of habitat are disruptive to ecological processes and also lead to local loss of biodiversity. This is why the vegetation type is listed as Endangered, due to high rates of transformation across the geographical range of the vegetation type. Locally, the main factors leading to transformation are urbanisation, infrastructure and cultivation. Both cultivation and utilities infrastructure occur within the study area. The current proposal will lead to additional localised loss of habitat.

Conservation status of broad vegetation types

According to scientific literature (Driver *et al.*, 2005; Mucina *et al.*, 2006), as shown in Table 3, the vegetation type is listed as Endangered.

The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists national vegetation types that are afforded protection on the basis of rates of transformation. The thresholds for listing in this legislation are higher than in the scientific literature, which means there are fewer ecosystems listed in the National Ecosystem List versus in the scientific literature.

The vegetation type is listed in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011).

Table 3: Conservation status of different vegetation types occurring in the study area.

Vegetation Type	Conservation status		
	Driver <i>et al.</i> 2005; Mucina <i>et al.</i> , 2006	National Ecosystem List (NEM:BA)	
Vaal-vet Grassland	Sandy	Endangered	Endangered

Parts of the site under the powerline are natural grassland and other parts are secondary grassland in previously cultivated areas. On the basis of historical aerial imagery, confirmed in the field, the previously cultivated areas have a well-established secondary growth that structurally resembles the original grassland, although it is poorer in species composition and diversity. The primary grasslands, which are within the CBA1 areas, have higher biodiversity value, but the secondary and degraded grasslands are of lower value.



Figure 5: Critical Biodiversity Areas within the broad study area that includes the proposed infrastructure.

Biodiversity Conservation Plans

The Free State CBA map classifies the natural vegetation of the province according to conservation value in decreasing value, as follows:

1. Protected
2. Critical Biodiversity Area One (Irreplaceable Areas) (RED)
3. Critical Biodiversity Area Two (Important Areas) (ORANGE)
4. Ecological Support Area (GREEN)
5. Other Natural Area (YELLOW)

This shows features within the study area within one of these classes, as follows:

1. CBA1 Areas: The northern parts of the grid corridor (see Figure 2).

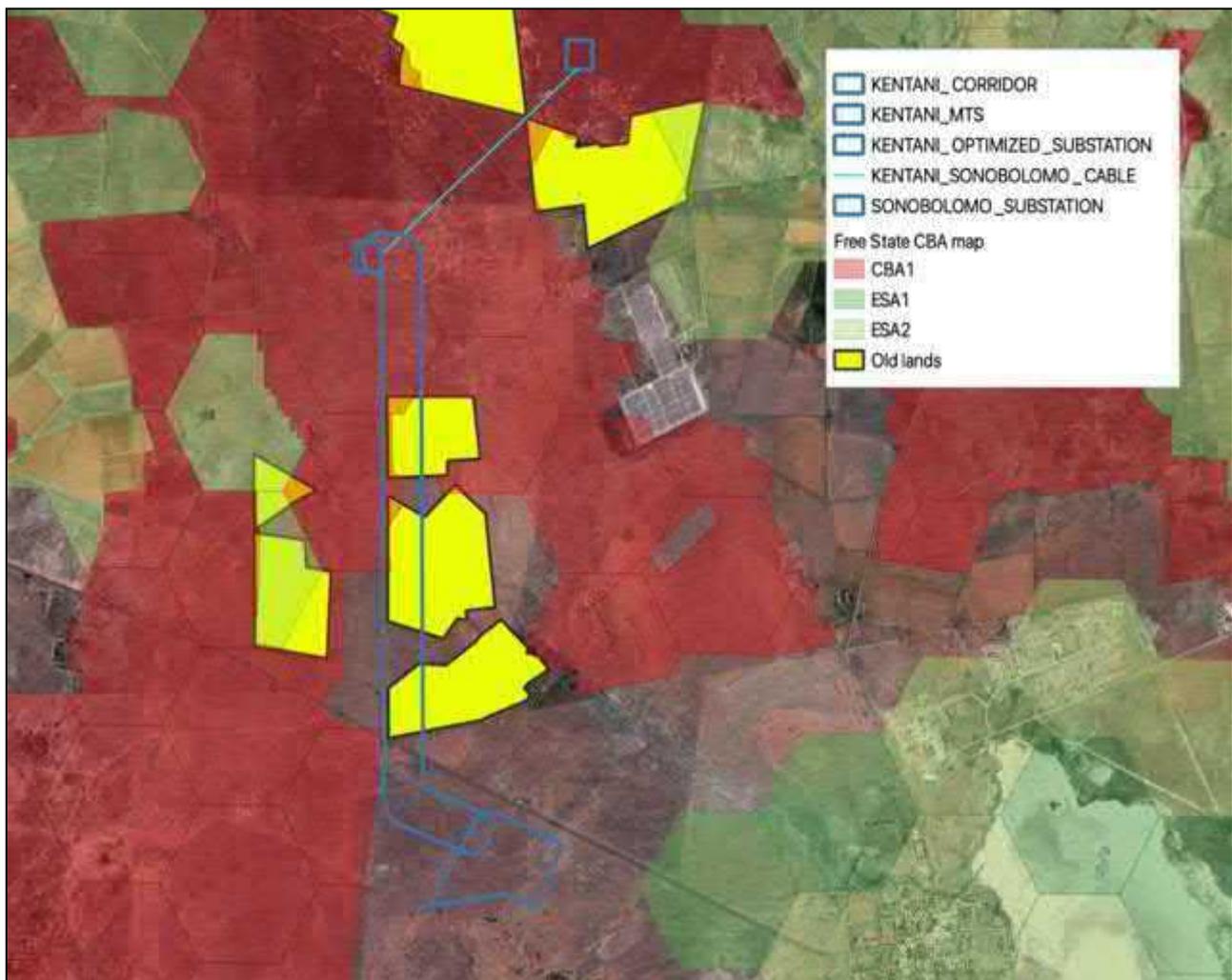


Figure 6: Previously cultivated areas in proximity to Critical Biodiversity Areas within the broad study area that includes the proposed infrastructure.

As discussed in the previous section, parts of the study area are previously cultivated. However, the location of these previously cultivated areas has been taken into account in assigning habitats to Critical Biodiversity Areas. Those areas that have been previously cultivated have very little overlap with areas assigned to CBA1 areas (see Figure 6). However, the CBA1 areas are within the area in which parts of the powerline will be placed, for which an impact of low significance after mitigation has been assessed (see below)

Other important patterns in the study area

The following applies to the study area:

1. No Ecological Support Areas (ESAs) occur within the footprint of the proposed infrastructure.
2. The study area is not within any protected area.
3. According to the National Protected Area Expansion Strategy, the study area is not within any area earmarked for future conservation.
4. There are no indigenous forests within the study area.
5. The site is not within any Freshwater Ecosystem Priority Areas.
6. The site is not within any Strategic Water Source Areas.

Anticipated impacts

There are two main impacts associated with construction of the proposed infrastructure:

1. Direct loss of habitat within the footprint of the proposed pylon and MTS infrastructure.
2. Invasion by alien invasive plant species, leading to degradation of habitat.

The main infrastructure components that will lead to loss of habitat are the Powerline pylons and MTS.

The remaining infrastructure is therefore limited entirely to overhead powerlines. These have a minimal local footprint, restricted to the tower structures and the maintenance roads. The overall loss of habitat due to these infrastructure components is insignificant compared to other approved infrastructure components, and also to existing transformation due to urbanization, utilities and cultivation in the general area.

The main potential remaining impact is therefore due to possible invasion by alien invasive plants within the project area.

Impact: loss of natural vegetation

This is evaluated only for the areas within the footprint of the proposed power line, on the basis that all other infrastructure will be located within areas where authorisation has already been obtained.

Issue	Loss of natural vegetation	
Description of Impact		
There will be localised disturbance of natural habitat within the footprint of tower structures during the construction phase.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low

Duration	Long-term	Long-term
Extent	Site	Site
Consequence	Medium	Low
Probability	Probable	Probable
Significance	Medium -	Low -
Degree to which impact can be reversed	The impact is partly reversible by rehabilitation of disturbed areas.	
Degree to which impact may cause irreplaceable loss of resources	Without mitigation of this impact, it is possible that the local footprint of construction around each tower structure will be more extensive than if the impact is controlled. This will lead to a more extensive loss of natural habitat than without mitigation. However, the diversity within the study area is relatively low and includes primarily common and widespread plant species. There would therefore be an insignificant level of irreplaceable loss of resources.	
Degree to which impact can be mitigated	There is significant scope for mitigation as per the recommended mitigation measures below.	
Mitigation actions		
The following measures are recommended:	Restrict activities to footprint areas, use existing maintenance and access roads, rehabilitate disturbed areas after construction, control alien invasive plant species. The presence of any species of conservation concern within the PV development area as well as along the grid connection should be checked during a preconstruction walk-through of these areas.	
Monitoring		
The following monitoring is recommended:	Annual monitoring for 3 years after construction to evaluate vegetation cover, species composition.	

Impact: invasion by alien invasive plant species

Issue	Invasion by alien invasive plant species	
Description of Impact		
There are a variety of alien invasive plant species that occur in the general geographical area. Disturbance will promote the opportunity for invasion by any of these species. Local invasion will degraded habitat and may spread further into surrounding areas. This may lead to more extensive loss of indigenous habitat and biodiversity and long-term control issues.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Operation	
Criteria	Without Mitigation	With Mitigation
Intensity	High	Low
Duration	Long-term	Long-term
Extent	Local	Site
Consequence	High	Low
Probability	Possible / frequent	Conceivable
Significance	Medium -	Very Low -
Degree to which impact can be reversed	The impact is reversible by implementing control measures.	

Degree to which impact may cause irreplaceable loss of resources	Without mitigation of this impact, it is possible that alien invasive plants will become locally established, develop dense nodes and then spread into surrounding areas. The more established they become, the more difficult it is to get rid of them and the greater the impact they will have on local ecosystems. The effect is exponential, not appearing significant at first, but suddenly becoming excessively difficult to change. At this end point, irreplaceable loss of resources is likely at a local level, and possibly more widely.
Degree to which impact can be mitigated	There is significant scope for mitigation as per the recommended mitigation measures below.
Mitigation actions	
The following measures are recommended:	Compile and implement an alien invasive control plan, monitor degree of invasion as well as outcome and effectiveness of control measures.
Monitoring	
The following monitoring is recommended:	Annual monitoring for the entire operational phase, as per the recommendations of the alien invasive control plan.

Cumulative impacts

Table 2: Loss of natural vegetation

Issue	Loss of natural vegetation	
Description of Impact		
There will be localised disturbance of natural habitat within the footprint of tower structures during the construction phase. This is evaluated only for the areas within the footprint of the proposed power line, on the basis that all other infrastructure will be located within areas where authorisation has already been obtained		
Cumulative impacts		
Nature of cumulative impacts	Existing loss of habitat in the study area is due to cultivation and other infrastructure. Solar PV projects that have been approved will lead to loss of habitat similar in magnitude to existing loss of habitat. Loss of habitat due to power line construction is negligible in comparison to these existing and anticipated future impacts.	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Insignificant	Insignificant

Table 3: Invasion by alien invasive plant species

Issue	Invasion by alien invasive plant species	
Description of Impact		
There are a variety of alien invasive plant species that occur in the general geographical area. Disturbance will promote the opportunity for invasion by any of these species. Local invasion will degraded habitat and may spread further into surrounding areas. This may lead to more extensive loss of indigenous habitat and biodiversity and long-term control issues.		
Cumulative impacts		
Nature of cumulative impacts	There is limited degree of invasion within the site and surrounding areas. However, some potentially problematic species occur in the area and can easily become established and problematic. In the absence of control measures, it is possible that combined effects may significantly degraded regional ecosystems.	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Medium -	Very Low -

CONCLUSIONS

- Desktop information, field data collection and mapping from aerial imagery confirms patterns provided in the DEA Online Screening Tool for the Terrestrial Biodiversity theme.
- The study area occurs within an Endangered Ecosystem, namely Vaal-Vet Sandy Grassland. Only the powerline part of the study area is in intact condition - other areas are secondary or degraded This verifies the VERY HIGH sensitivity for the Terrestrial Biodiversity Theme for the CBA1 areas, but other areas should be LOW sensitivity for this theme.
- Parts of the study area occur within Critical Biodiversity Area 1 in the Free State Conservation Plan. This verifies the VERY HIGH sensitivity for the Terrestrial Biodiversity Theme for the CBA1 areas, but it should be LOW for areas outside the CBA1 area.
- The proposed project consists a MTS, BESS as well as the 132kV and 400kV power lines linking the MTS to Kentani Solar Project and existing Eskom 400kV lines respectively. Other infrastructure components to which these are linked are already approved for development.
- Anticipated impacts due to the power lines are localised loss of habitat below pylon structures, and possible invasion by alien invasive plant species. Both impacts were assessed as having Medium significance before mitigation and Low significance after mitigation.
- On the basis of the assessment undertaken here, which indicates two possible impacts that can be mitigated, it is considered appropriate that they project be given approval.

REFERENCES:

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Terrestrial Plant Species Compliance Statement

Kentani MTS and associated infrastructure near Dealesville in the Free State Province.

Prepared by: Dr David Hoare
Pr.Sci.Nat. (Botany, Ecology) 400221/05

For: SLR Consulting (Pty) Ltd (South Africa)

12 November 2021

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SPECIALIST DETAILS & DECLARATION

This report has been prepared in accordance with Section 13: General Requirements for Environmental Assessment Practitioners (EAPs) and Specialists as well as per Appendix 6 of GNR 982 – Environmental Impact Assessment Regulations and the National Environmental Management Act (NEMA, No. 107 of 1998 as amended 2017) and Government Notice 704 (GN 704). It has been prepared independently of influence or prejudice by any parties.

The details of Specialists are as follows –

Table 1: Details of Specialist

Specialist	Qualification accreditation	and Client	Signature
Dr David Hoare (Pr.Sci.Nat.)	PhD Botany	SLR	 Date: 12/11/2021

Details of Author:

Dr David Hoare

PhD (Botany) – Nelson Mandela Metropolitan University, Port Elizabeth

Professional Natural Scientist, South African Council for Natural Scientific Professions, Reg. no. 400221/05 (Ecology, Botany)

Statement of independence:

I, David Hoare, as the appointed plant species specialist, hereby declare/affirm the correctness of the information provided in this compliance statement, and that I:

1. meet the general requirements to be independent and
2. have no business, financial, personal or other interest in the proposed development and that no circumstances have occurred that may have compromised my objectivity; and
3. am aware that a false declaration is an offence in terms of regulation 48 of the EIA Regulations (2014).



Dr David Hoare

12 November 2021
Date

TERMS OF REFERENCE

Where the sensitivity in the Screening Report from the web-based Online Screening Tool has been confirmed to be LOW, a Plant Species Compliance Statement is required, either (1) for areas where no natural habitat remains, or (2) in natural areas where there is no suspected occurrence of SCC.

The compliance statement must be prepared by a SACNASP registered specialist under one of the two fields of practice (Botanical Science or Ecological Science).

The compliance statement must:

- o be applicable within the study area
- o confirm that the study area is of "low" sensitivity for terrestrial plant species; and
- o indicate whether or not the proposed development will have any impact on SCC.

The compliance statement must contain, as a minimum, the following information:

- o contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;
- o a signed statement of independence by the specialist;
- o a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
- o a baseline profile description of biodiversity and ecosystems of the site;
- o the methodology used to verify the sensitivities of the terrestrial biodiversity and plant species features on the site including the equipment and modelling used where relevant;
- o in the case of a linear activity, confirmation from the terrestrial biodiversity specialist that, in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;
- o where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr;
- o a description of the assumptions made as well as any uncertainties or gaps in knowledge or data; and
- o any conditions to which this statement is subjected.

A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

INTRODUCTION

Project Background

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing the development of (1) Main Transmission Substation (MTS) and three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines), Li-Ion Battery Energy Storage System, the associated electrical infrastructure, (the 'proposed development') that will connect to the authorised Solar Energy Facilities i.e. Kentani, Klipfontein, Klipfontein 2, Leliehoek, Sonoblomo, Braklaagte, Boschrand 2, Meeding, Irene and Braambosch, collectively known as the Kentani Cluster located near the town of Dealesville, Tokologo Local Municipality (Lejweleputswa District) in the Free State Province. The proposed development will also involve the re-routing of eight (8) 132kV powerlines within the grid connection corridor which has been authorised as part of the Kentani Cluster, making provision for this routing in the new proposed MTS (Figure 1).

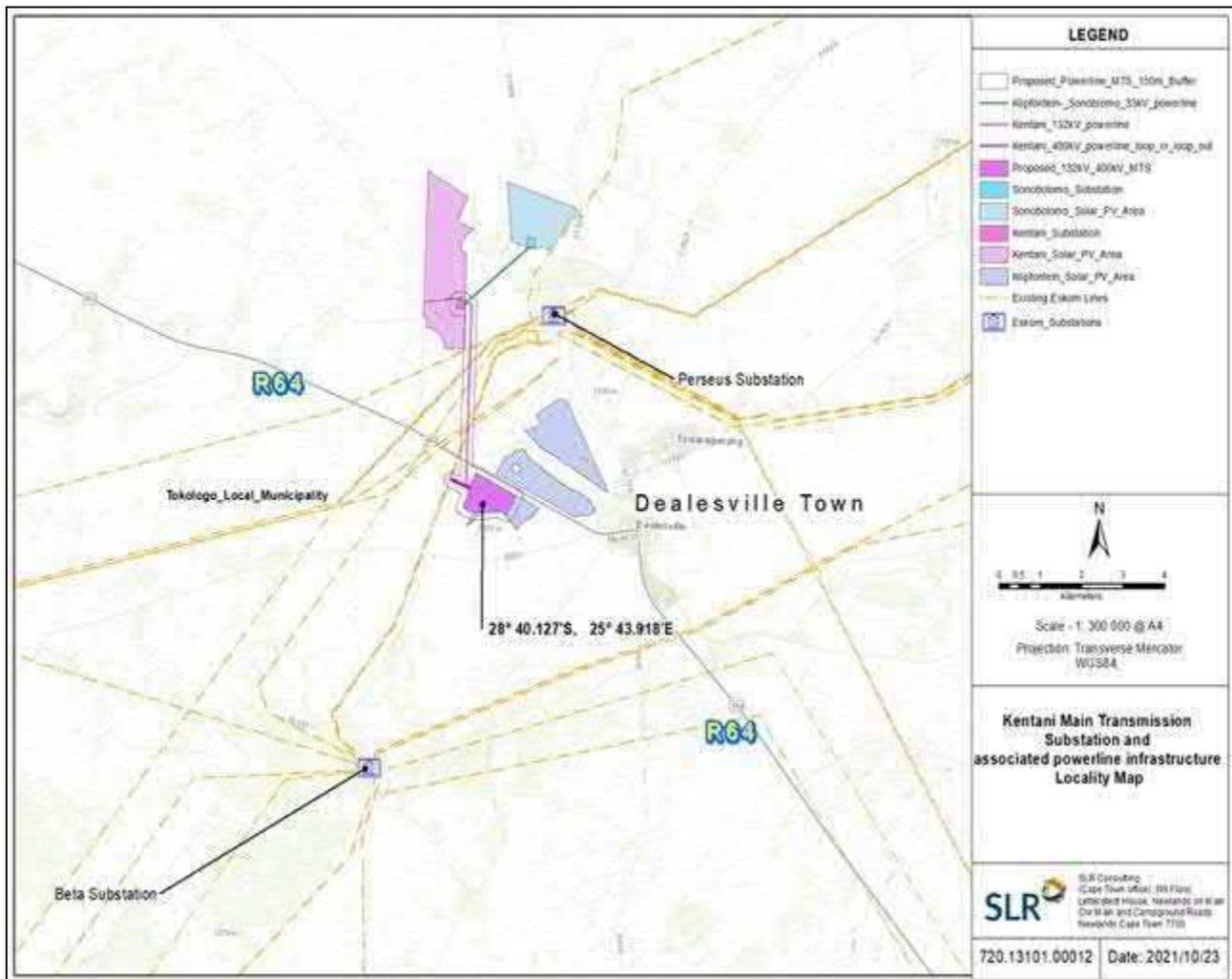


Figure 1: Location of proposed Main Transmission Substation (MTS) and associated electrical infrastructure (including grid connection corridors).

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
- Sonobloomo 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)]. 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), which is proposed on the Remaining Extent of the Farm Klipfontein No. 305 (SG Code: F0040000000030500000). Of the eleven (11) powerlines, eight (8) are 132kV powerlines which are located within the authorised corridor, and which have been included as part of the authorised solar PV developments. 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).

Considering the above, it is important to note that the location of the proposed MTS as well as the corridors being proposed for the powerlines 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 2016¹.

Moreover, the proposed MTS and powerlines are located within the Kimberly Renewable Energy Development Zone and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notices No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively. The proposed MTS will occupy a footprint of approximately 64 hectares (ha)

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).

(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. 800m in length) are being proposed and will connect the proposed MTS to the existing Eskom 400kV powerline, located approximately 1km west of the proposed MTS site, via a Loop-In-Loop Out (LILO) connection; and
2. One (1) 132kV powerline (approx. 4km in length) is being proposed and 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.
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.

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.

As part of the BA process, powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the 400kV and 132kV powerlines. 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. In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations [4 December 2014, Government Notice (GN) R982, R983, R984 and R985, 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 Department of Forestry, Fisheries and the Environment (DFFE), prior to the commencement thereof. One (1) application for EA for the proposed development will be submitted to the DFFE, in the form of a BA process, in terms of the NEMA EIA Regulations of 2014 (as amended).

In accordance with GN 320 and GN 1150 (20 March 2020)² of the NEMA EIA Regulations of 2014 (as amended), prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (i.e., Screening Tool). Mrs Elize Butler, as the Palaeontology Specialist, has been commissioned to verify the sensitivity of the 132kV/400kV Main Transmission Substation (MTS) and Associated Infrastructure project site under these specialist protocols.

² GN 320 (20 March 2020): 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

Identified Theme Sensitivity

A sensitivity screening report from the DEA Online Screening Tool was requested in the application category: Utilities Infrastructure | Electricity | Generation | Renewable | Solar | PV. The DEA Screening Tool report for the area indicates the following ecological sensitivities:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Plant Species Theme				X

Plant Species theme

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
Low	Low Sensitivity

METHODOLOGY

The detailed methodology followed as well as the sources of data and information used as part of this assessment is described below.

Survey timing

The study commenced as a desktop-study followed by a site-specific field study on 12 October 2021. The site is within the Grassland Biome with a peak rainfall season in summer, which occurs from November to April. The timing of the survey is therefore sub-optimal in terms of assessing the flora of the site. However, despite this limitation, the overall condition of the vegetation was possible to be determined with a high degree of confidence. In addition, the entire area was previously assessed as part of the environmental authorisation process for the Klipfontein PV facility, for which authorisation has already been obtained ([14/12/16/3/3/2/722](#)) and for which the original specialist study was made available.

Field survey approach

During the field survey, all major natural variation on site was assessed and select locations were traversed on foot. A hand-held Garmin GPSMap 64s was used to record a track within which observations were made.

Aerial imagery from Google Earth was used to identify and assess habitats on site. Patterns identified from satellite imagery were verified on the ground. During the field survey, particular attention was paid to ensuring that all habitat variability was covered physically on the ground during the search for plant species. From this ground survey, as well as ad hoc observations on site, a checklist of plant species occurring on site was compiled.

Digital photographs were taken of all plant species that were seen on site. All plant species recorded were uploaded to the iNaturalist website.

Sources of information

Plant species

- Broad vegetation types occurring on site were obtained from Mucina and Rutherford (2006), with updates according to the SANBI BGIS website (<http://bgis.sanbi.org>). The description of each vegetation type includes a list of plant species that may be expected to occur within the particular vegetation type.
- Plant species that could potentially occur on in the general area was extracted from the NewPosa database of the South African National biodiversity Institute (SANBI) for the quarter degree grid/s in which the site is located.
- The IUCN Red List Category for plant species, as well as supplementary information on habitats and distribution, was obtained from the SANBI Threatened Species Programme (Red List of South African Plants, <http://redlist.sanbi.org>).
- Lists were compiled specifically for any species at risk of extinction (Red List species) previously recorded in the area. Historical occurrences of threatened plant species were obtained from the South African National Biodiversity Institute (<http://posa.sanbi.org>) for the quarter degree square/s within which the study area is situated. Habitat information for each species was

obtained from various published sources. The probability of finding any of these species was then assessed by comparing the habitat requirements with those habitats that were found, during the field survey of the site, to occur there.

- Regulations published for the National Forests Act (Act 84 of 1998) (NFA) as amended, provide a list of protected tree species for South Africa. The species on this list were assessed in order to determine which protected tree species have a geographical distribution that coincides with the study area and habitat requirements that may be met by available habitat in the study area. The distribution of species on this list were obtained from published sources (e.g. van Wyk & van Wyk 1997) and from the SANBI Biodiversity Information System website (<http://sibis.sanbi.org/>) for quarter degree grids in which species have been previously recorded. Species that have been recorded anywhere in proximity to the site (within 100 km), or where it is considered possible that they could occur there, were listed and were considered as being at risk of occurring there.

RESULTS

Broad vegetation patterns

There is one regional vegetation type in the study area, namely Vaal-vet sandy grassland, briefly described below, including expected species composition.

Vaal-vet Sandy Grassland (Gh10)

Distribution

North-West and Free State Provinces: South of Lichtenburg and Ventersdorp, stretching southwards to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort area north of Bloemfontein. Altitude 1 220–1 560 m, generally 1 260–1 360 m.

Vegetation & Landscape Features

Plains-dominated landscape with some scattered, slightly irregular undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element. Dominance of *Themeda triandra* is an important feature of this vegetation unit. Locally low cover of *T. triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall.

Important Taxa

Graminoids	<i>Antheophora pubescens</i> (d), <i>Aristida congesta</i> (d), <i>Chloris virgata</i> (d), <i>Cymbopogon caesius</i> (d), <i>Cynodon dactylon</i> (d), <i>Digitaria argyrograpta</i> (d), <i>Elionurus muticus</i> (d), <i>Eragrostis chloromelas</i> (d), <i>E. lehmanniana</i> (d), <i>E. plana</i> (d), <i>E. trichophora</i> (d), <i>Heteropogon contortus</i> (d), <i>Panicum gilvum</i> (d), <i>Setaria sphacelata</i> (d), <i>Themeda triandra</i> (d), <i>Tragus berteronianus</i> (d), <i>Brachiaria serrata</i> , <i>Cymbopogon pospischilii</i> , <i>Digitaria eriantha</i> , <i>Eragrostis curvula</i> , <i>E. obtusa</i> , <i>E. superba</i> , <i>Panicum coloratum</i> , <i>Pogonarthria squarrosa</i> , <i>Trichoneura grandiglumis</i> , <i>Triraphis andropogonoides</i> .
Herbs	<i>Stachys spathulata</i> (d), <i>Barleria macrostegia</i> , <i>Berkheya onopordifolia</i> var. <i>onopordifolia</i> , <i>Chamaesyce inaequilatera</i> , <i>Geigeria aspera</i> var. <i>aspera</i> , <i>Helichrysum caespititium</i> , <i>Hermannia depressa</i> , <i>Hibiscus pusillus</i> , <i>Monsonia burkeana</i> , <i>Rhynchosia adenodes</i> , <i>Selago densiflora</i> , <i>Vernonia oligocephala</i> .
Geophytic Herbs	<i>Bulbine narcissifolia</i> , <i>Ledebouria marginata</i> .
Succulent Herb	<i>Tripteris aghillana</i> var. <i>integrifolia</i> .
Low Shrubs	<i>Felicia muricata</i> (d), <i>Pentzia globosa</i> (d), <i>Anthospermum rigidum</i> subsp. <i>pumilum</i> , <i>Helichrysum dregeanum</i> , <i>H. paronychioides</i> , <i>Ziziphus zeyheriana</i> .
<u>Endemic Taxa</u>	
Herb	<i>Lessertia phillipsiana</i> .

Red List plant species of the study area

Listed plant species previously recorded in the Free State were obtained from the South African National Biodiversity Institute (SANBI) website. These are listed in Appendix 2. There are seven threatened species on this list and a total of 35 species of conservation concern that occur in the Free State, but none of them have a geographical distribution that could include the site. **There are therefore no threatened, near threatened or rare species that occur in the study area.**

Plant species recorded in the study area

A total of only 36 plant species were recorded during the field survey (Appendix 1). Some of these are listed for the vegetation type, but they do not represent a typical example of the vegetation type. The diversity of shrubs and low trees, and the presence of species such as *Albucca setosa*, suggest that the vegetation is an intermediate to the Vaalbos Rocky Shrubland vegetation type, which occurs about 6 km to the west, especially in places where there is surface rockiness. The species composition also suggests some similarities with the other main grassland vegetation type in the general area, namely Western Free State Clay Grassland, with the soil properties probably determining the local species composition (sand vs clay).

The number of invasive species was low and included *Argemone ochroleuca* and *Solanum elaeagnifolium*, neither of which was widespread. None of the species seen on site are rare or restricted.

CONCLUSIONS

- Desktop information, field data collection and mapping from aerial imagery confirms patterns provided in the DEA Online Screening Tool for the Plant Species theme.
- Due to its geographical location, the study area is not important for any plant SCC.

REFERENCES:

- GERMISHUIZEN, G., MEYER, N.L., STEENKAMP, Y and KEITH, M. (eds.) (2006). A checklist of South African plants. Southern African Botanical Diversity Network Report No. 41, SABONET, Pretoria.
- IUCN (2001). *IUCN Red Data List categories and criteria: Version 3.1*. IUCN Species Survival Commission: Gland, Switzerland.
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- VAN WYK, A.E. AND SMITH, G.F. (Eds) 2001. Regions of Floristic Endemism in Southern Africa: A review with emphasis on succulents, pp. 1-199. Umdaus Press, Pretoria.

APPENDICES:

Appendix 1: Plant species recorded in the footprint area.

Albuca setosa
Aptosimum procumbens
Argemone ochroleuca
Aristida congesta subsp. *congesta*
Asparagus suaveolens
Berkheya rigida
Chrysocoma ciliata
Cyperus cristatus
Diospyros lycioides
Ehretia rigida
Felicia muricata
Anthospermum rigidum subsp. *pumilum*
Dimorphotheca sp.
Eragrostis sp.
Limeum sp
Lycium sp.
Senecio sp.
Helichrysum argyrosphaerum
Helichrysum luteoalbum
Lasiosiphon polycephalus
Lopholaena coriifolia
Lotononis laxa
Macledium zeyheri
Melolobium candicans
Moraea pallida
Olea europaea subsp. *cuspidata*
Ruschia hamata
Salvia verbenaca
Schoenoplectus muricinux
Searsia lancea
Selago densiflora
Solanum elaeagnifolium
Themeda triandra
Vachellia nilotica
Viscum rotundifolium
Ziziphus mucronata

Appendix 2: Listed SCC plant species of Free State.

Alepidea cordifolia EN
Aloe dominella NT
Anemone fanninii NT
Argyrobium campicola NT
Brachystelma duplicatum Critically Rare
Brachystelma incanum VU
Calpurnia reflexa Rare
Crassula tuberella VU
Dioscorea sylvatica VU
Disa sankeyi Rare
Drimia sanguinea NT
Eucomis bicolor NT
Gladiolus robertsoniae NT
Helichrysum haygarthii Rare
Kniphofia ensifolia subsp. *autumnalis* EN
Lithops lesliei subsp. *lesliei* NT
Lithops salicola NT
Lotononis amajubica Rare
Merwillia plumbea NT
Nerine gracilis VU
Pentzia oppositifolia Rare
Pterygodium alticola Rare
Schizoglossum montanum Rare
Searsia dracomontana NT
Selaginella nubigena Rare
Syncolostemon macranthus NT
Zaluzianskya distans Rare

Visual

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1. INTRODUCTION

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing to add 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 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.:

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- Klipfontein Solar PV
- Klipfontein 2 Solar PV
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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

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) will 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 not 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.

2. SITE SENSITIVITY VERIFICATION METHODOLOGY

A site sensitivity verification has been conducted in support of the Visual Impact Assessment (VIA) for the proposed Main Transmission Substation (MTS), power lines and access roads. The verification exercise is based on a desktop-level assessment supported by field-based observation and involved an assessment of factors as outlined below.

▪ Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was initially sourced from spatial databases provided by National Geospatial Information (NGI), the South African National Biodiversity Institute (SANBI) and the South African National Land Cover Dataset (DFFE / Geoterraimage – 2020). The characteristics identified via desktop means were later verified during the site visit.

▪ Identification of sensitive receptors

Visual receptor locations that are sensitive and / or potentially sensitive to the visual intrusion of the proposed development were identified by way of a desktop assessment as well as field-based investigation. Initially Google Earth imagery (2021) was used to identify potential receptors within the study area and where possible, these receptor locations were verified and assessed during the field investigation.

▪ Fieldwork and photographic review

A two (2) day site visit was undertaken on the 12th and 13th of October 2021 (early spring). The aim of the site visit was to:

- verify the landscape characteristics identified via desktop means;
- conduct a photographic survey of the proposed study area;
- verify the sensitivity of visual receptor locations identified via desktop means;
- eliminate receptor locations that are unlikely to be influenced by the proposed development;
- identify any additional visually sensitive receptor locations within the study area; and
- assist with the assessment and rating of receptor impacts.

3. OUTCOME OF SITE SENSITIVITY VERIFICATION

Visual sensitivity of the broader area surrounding the proposed development was found to be **low** largely due to the relatively low number of potentially sensitive receptors in the area and the level of human transformation and landscape degradation in the area.

A screening exercise was undertaken with the aim of indicating any areas that should be precluded from the proposed development footprint. From a visual perspective, these are areas where the establishment of power lines and/or substation infrastructure would result in the greatest probability of visual impacts on sensitive or potentially sensitive visual receptors.

Using GIS-based visibility analysis, it was possible to determine which sectors of the assessment corridors would be visible to the highest numbers of receptors in the study area. However, this analysis found that no areas are significantly more visible than any other area. As such, in terms of visibility, no areas were found to be particularly sensitive.

In determining visual sensitivity, consideration must also be given to the direct visual impact of the proposed development on any nearby farmsteads or receptors. However, investigation determined that there are no farmsteads or potentially sensitive receptors within 500 m of either of any elements of the power line or MTS development. As such, **no** areas of visual sensitivity were identified in relation to any of the power line alignments or the substation site.

In assessing visual sensitivity, the proposed development was examined in relation to the Landscape Theme of the National Environmental Screening Tool to determine the relative landscape sensitivity for this type of development. The tool does not however identify any landscape sensitivities in respect of power line or substation development.

4. CONCLUSION

A site sensitivity verification for the Visual Impact Assessment (VIA) for the proposed Main Transmission Substation (MTS), BESS, power lines and access roads has been conducted, based on a desktop-level assessment supported by field-based observation. As outlined above, it was verified that there are no areas of visual sensitivity in relation to any of the power line alignments or substation site. Furthermore, no landscape sensitivities were identified in terms of the Landscape Theme of the National Environmental Screening Tool.



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

Visual Impact Assessment Report – Basic Assessment

DFFE Reference:
Report Prepared by:
Issue Date:
Version No.:

To be Allocated
Kerry Schwartz / SiVEST
09 November 2-21
1

EXECUTIVE SUMMARY

SiVEST SA (Pty) Ltd (hereafter referred to as “SiVEST”) 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 Visual 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.

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.

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) power lines, eight (8) are 132kV power lines 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 power lines [i.e., two (2) 400kV and one (1) 132kV power lines] 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. As part of this EIA process, a Visual Impact Assessment (VIA) is required in order to inform the Basic Assessment Report (BAR) and Application for Environmental Authorisation (EA) under NEMA.

The VIA has determined that the study area has a somewhat mixed visual character, transitioning from the heavily transformed landscape associated with Perseus Substation and the town of Dealesville in the east to a more rural / pastoral character across the remainder of the study area. Hence, although the proposed development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed development in relatively close proximity to Perseus Substation and its extensive network of high voltage power lines, will reduce the level of contrast.

A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a **low** visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. The area is not however typically valued for its tourism significance and no leisure-based tourism facilities or formal protected areas were identified within 5 kms of the proposed development. This factor in conjunction with the high levels of transformation in the east have reduced the overall visual sensitivity of the area.

Eighteen (18) potentially sensitive receptors were identified in the study area, none of which was found to be sensitive. All of the identified receptors are believed to be farmsteads that are regarded as *potentially* sensitive visual receptors as the proposed development will likely alter natural or semi-natural vistas experienced from these locations. Three of the receptor locations are outside the viewshed for the proposed power lines and substation site and none of the remaining receptors are expected to experience high levels of visual impact as a result of the proposed development. Ten of the remaining receptor locations are expected to experience moderate levels of impact as a result of the power line and substation development, while five receptors will only experience low levels of visual impact.

Although the R64 receptor road traverses the study area, motorists travelling along this route are only expected to experience low levels of impact from the proposed development due to the degree of landscape degradation already present.

An assessment of overall impacts revealed that visual impacts associated with the proposed power lines, MTS and associated infrastructure are of low significance during construction, operation and decommissioning phases, with a number of mitigation measures available.

Considering the presence of extensive electrical infrastructure and multiple planned renewable energy projects, the introduction of additional electrical infrastructure in the area will result in further change in the visual character of the area and alteration of the inherent sense of place, extending an increasingly industrial character into the broader area and causing significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommended mitigation measures. In light of this, cumulative impacts (with mitigation) have been rated as **low** during construction and decommissioning and **medium** during operation.

From a visual perspective therefore, no fatal flaws were identified in respect of the proposed development and the proposed Main Transmission Substation (MTS) , BESS and associated 400 kV, 132 kV and 33kV overhead power lines and access roads are deemed acceptable and the Environmental Authorization (EA) should be granted. SiVEST is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

**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;	Appendix A
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix A
c) an indication of the scope of, and the purpose for which, the report was prepared;	Appendix B
(cA) an indication of the quality and age of base data used for the specialist report;	Section 2.5
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 5 Section 7
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 2.3.3
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
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 6
g) an identification of any areas to be avoided, including buffers;	Section 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;	Section 6
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 5 Section 7
k) any mitigation measures for inclusion in the EMPr;	Section 7 Section 8
l) any conditions for inclusion in the environmental authorisation;	No specific conditions relating to the visual environment need to be included in the

	environmental authorisation (EA)
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 8
n) a reasoned opinion- <ul style="list-style-type: none"> i. (as to) whether the proposed activity, activities or portions thereof should be authorised; <ul style="list-style-type: none"> (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;	Section 2.3.6
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	No feedback has yet been received from the public participation process regarding the visual environment
q) any other information requested by the competent authority.	No information regarding the visual study has been requested from the competent authority to date.
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.	Part A of the Assessment Protocols published in GN 320 on 20 March 2020 is applicable - Site sensitivity verification report is provided Appendix C



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:	SiVEST SA (Pty) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	2	Percentage Procurement recognition	110
Specialist name:	Kerry Schwartz			
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DECLARATION BY THE SPECIALIST

I, **Kerry Schwartz**, 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.

K Schwartz

Signature of the Specialist

SiVEST SA (Pty) Ltd

Name of Company:

08 November, 2021

Date:

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- Appendix B: Specialist Terms of Reference
- Appendix C: Site Sensitivity Verification Report
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GLOSSARY OF TERMS

Anthropogenic feature: An unnatural feature resulting from human activity.

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).

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.

Sensitive visual receptors: An individual, group or community that is subject to the visual influence of the proposed development and is adversely impacted by it. They will typically include locations of human habitation and tourism activities.

Slope Aspect: Direction in which a hill or mountain slope faces.

Study area / Visual assessment zone; The study area or visual assessment zone is assumed to encompass a zone of 5km from the outer boundary of the proposed Solar PV Facility application site.

Viewpoint: A point in the landscape from where a particular project or feature can be viewed.

Viewshed / Visual Envelope: The geographical area which is visible from a particular location.

Visual character: The pattern of physical elements, landforms and land use characteristics that occur consistently in the landscape to form a distinctive visual quality or character.

Visual contrast: The degree to which the development would be congruent with the surrounding environment. It is based on whether or not the development would conform with the land use, settlement density, forms and patterns of elements that define the structure of the surrounding landscape.

Visual exposure: The relative visibility of a project or feature in the landscape.

Visual impact: The effect of an aspect of the proposed development on a specified component of the visual, aesthetic or scenic environment within a defined time and space.

Visual receptors: An individual, group or community that is subject to the visual influence of the proposed development but is not necessarily adversely impacted by it. They will typically include commercial activities, residents and motorists travelling along routes that are not regarded as scenic.

Visual sensitivity: The inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (visual character), spatial distribution of potential receptors, and the likely value judgements of these receptors towards the new development, which are usually based on the perceived aesthetic appeal of the area.

LIST OF ABBREVIATIONS

BA	Basic Assessment
DBAR	Draft Basic Assessment Report
DM	District Municipality
DoE	Department of Mineral Resources and Energy
DEM	Digital Elevation Model
DFFE`	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EMP	Environmental Management Plan
FBAR	Final Basic Assessment Report
GIS	Geographic Information System
HA	Hectares
HIA	Heritage Impact Assessment
I&AP	Interested and/or Affected Party
IPP	Independent Power Producer
LM	Local Municipality
kV	Kilovolt
MW	Megawatt
MTS	Main Transmission Substation
NEMA	National Environmental Management Act
NGI	National Geo-Spatial Information
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
O&M	Operation and Maintenance
OHP	Overhead power line
PV	Photovoltaic
SANBI	South African National Biodiversity Institute

SPEF Solar Photovoltaic Energy Facility

VIA Visual Impact Assessment

VR Visual Receptor

WEF Wind Energy Facility

1 INTRODUCTION

SiVEST SA (Pty) Ltd (hereafter referred to as “SiVEST”) 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 Visual 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), which is proposed on the Remaining Extent of the Farm Klipfontein No. 305 (SG Code: F0040000000030500000). Of the eleven (11) powerlines, eight (8) are 132kV powerlines which are located within the authorised corridor, and which have been included as part of the authorised solar PV developments. 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).

Considering the above, it is important to note that the location of the proposed MTS as well as the corridors being proposed for the powerlines 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.

Moreover, the proposed MTS and powerlines are located within the Kimberly Renewable Energy Development Zone and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notices No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively. 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).

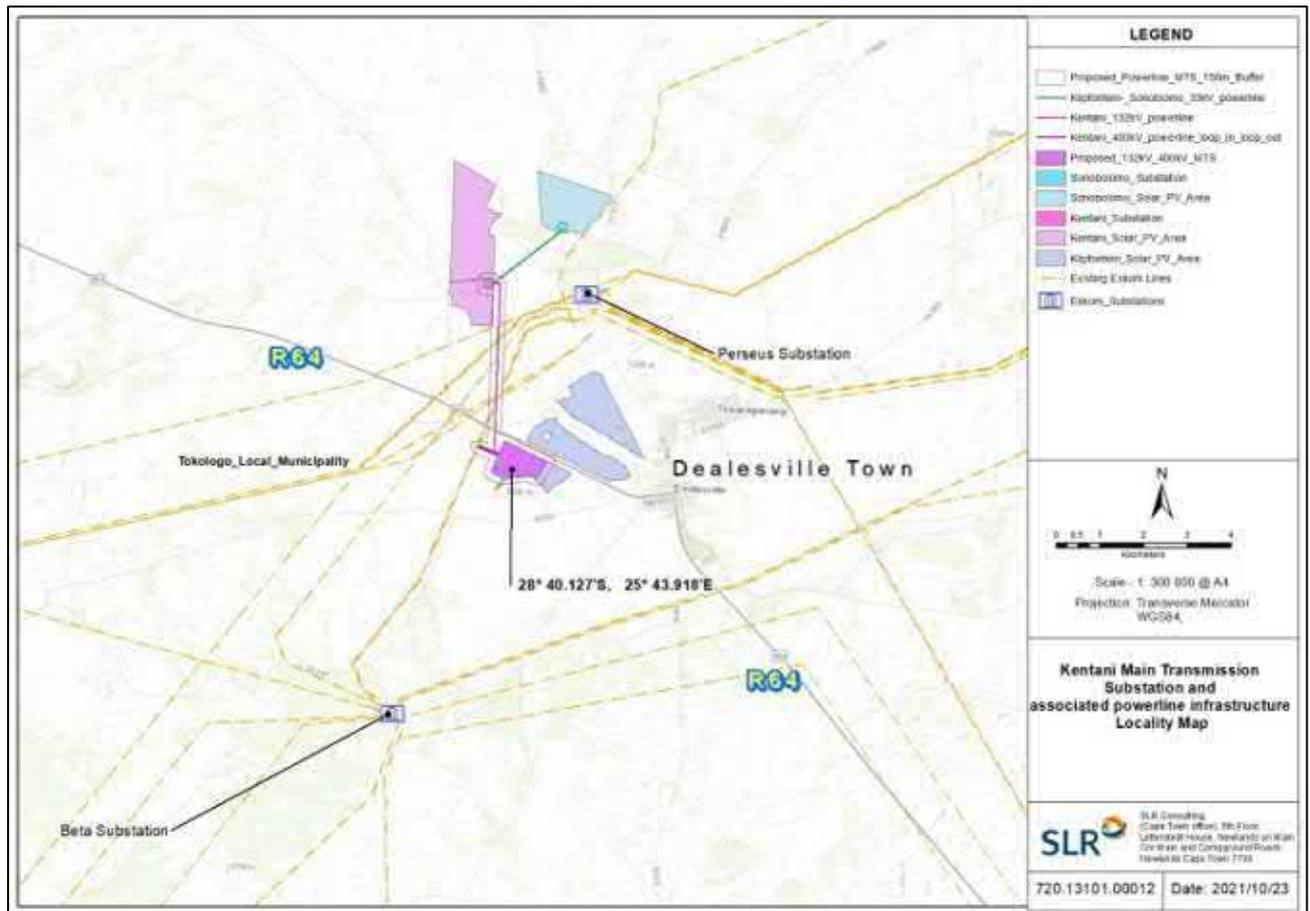


Figure 1: Locality map

2 ASSESSMENT METHODOLOGY

2.1 Specialist Credentials

Please see **Appendix A**.

2.2 Terms of Reference (ToR)

The terms of reference for this VIA are included in **Appendix B**.

2.3 Approach

This VIA has been based on a desktop-level assessment supported by field-based observation drawn from a two-day site visit undertaken between 12th and 13th October 2021. Information has also been drawn from the original VIA for the Kentani PV Cluster undertaken by the CSIR in 2015.

2.3.1 Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was initially sourced from spatial databases provided by NGI, the South African National Biodiversity Institute (SANBI) and the South African National Land Cover

Dataset (Geoterrimage – 2020). The characteristics identified via desktop analysis were later verified during the site visit.

2.3.2 Identification of sensitive receptors

Visual receptor locations and routes that are sensitive and/or potentially sensitive to the visual intrusion of the proposed development were assessed in order to determine the impact of the proposed development on each of the identified receptor locations.

2.3.3 Fieldwork and photographic review

A two (2) day site visit was undertaken between the 12th and 13th of October 2021 (early spring). The aim of the site visit was to:

- verify the landscape characteristics identified via desktop means;
- conduct a photographic survey of the study area;
- verify, where possible, the sensitivity of visual receptor locations identified via desktop means;
- eliminate receptor locations that are unlikely to be influenced by the proposed development;
- identify any additional visually sensitive receptor locations within the study area; and
- inform the impact rating assessment of visually sensitive receptor locations (where possible).

2.3.4 Visual / Landscape Sensitivity

GIS technology was used to identify any specific areas of potential visual sensitivity within the study area. These would be areas where the establishment of a power line or substation would result in the greatest probability of visual impacts on potentially sensitive visual receptors.

In addition, the National Environmental Screening Tool² was examined to determine any relative landscape sensitivity in respect of the proposed development.

2.3.5 Impact Assessment

A rating matrix was used to provide an objective evaluation of the significance of the visual impacts associated with the proposed development, both before and after implementing mitigation measures. Mitigation measures were identified (where possible) to minimise the visual impact of the proposed development. The rating matrix made use of several different factors including geographical extent, probability, reversibility, irreplaceable loss of resources, duration and intensity, in order to assign a level of significance to the visual impact of the project.

A separate rating matrix was used to assess the visual impact of the proposed development on each identified visual receptor location. This matrix is based on three (3) parameters, namely the distance of an identified visual receptor from the proposed development, the presence of screening factors and the degree to which the proposed development would contrast with the surrounding environment.

² <https://screening.environment.gov.za/screeningtool/>

2.3.6 Consultation with I&APs

Continuous consultation with Interested and Affected Parties (I&APs) undertaken during the public participation process will be used (where available) to help establish how the proposed development will be perceived by the various receptor locations and the degree to which the impact will be regarded as negative. Although I&APs have not yet provided any feedback in this regard, the report will be updated to include relevant information as and when it becomes available. If no relevant comments are received requiring the report to be updated, the report will automatically inform the final BA report.

2.4 Assumptions and Limitations

- Substations and power lines are very large structures by nature and could impact on receptors that are located relatively far away, particularly in areas of very flat terrain. Given the nature of the receiving environment and the height of the various components of the proposed development, the study area or visual assessment zone is assumed to encompass a zone of 5 km from the outer boundary of the combined power line assessment corridors and substation site. This 5 km limit on the visual assessment zone relates to the importance of distance when assessing visual impacts. Although the proposed development may still be visible beyond 5 km, the degree of visual impact would diminish considerably and as such the need to assess the impact on potential receptor locations beyond this distance would not be warranted.
- The identification of visual receptors involved a combination of desktop assessment as well as field-based observation. Initially Google Earth imagery was used to identify potential receptors within the study area. Where possible, these receptor locations were verified and assessed during a site visit which was undertaken between the 12th and the 13th of October 2021.
- Due to the extent of the study area it was not possible to visit or verify every potentially sensitive visual receptor location. As such, several broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development. It should be noted that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the occupants on the scenic quality of views from the facility and on people's perceptions of the value of "Green Energy". Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. Thus, the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that any visual impact will be experienced.
- The potential visual impact at each visual receptor location was assessed using a matrix developed for this purpose. The matrix is based on three main parameters relating to visual impact and, although relatively simplistic, it provides a reasonably accurate indicative assessment of the degree of visual impact likely to be experienced at each receptor location as a result of the proposed development. It is however important to note the limitations of quantitatively assessing a largely subjective or qualitative type of impact and as such the matrix should be seen merely as a representation of the likely visual impact at a receptor location.
- As stated above, the exact status of all the receptors could not be verified during the field investigation and as such the receptor impact rating was largely undertaken via desktop means.

- Receptors that were assumed to be farmsteads were still regarded as being potentially sensitive to the visual impacts associated with the proposed development and were thus assessed as part of the VIA.
- Based on the project description provided by Mainstream, all analysis undertaken for this VIA is based on a worst-case scenario where the maximum height of power line towers and substation structures is assumed to be 22m.
- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for the study area derived from the National Geo-Spatial Information (NGI)'s 25m DEM is fairly coarse and somewhat inconsistent and as such, localised topographic variations in the landscape may not be reflected on the Digital Elevation Model (DEM) used to generate the viewsheds and visibility analyses conducted in respect of the proposed development.
- Viewsheds do not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.
- No feedback regarding the visual environment has been received from the public participation process to date. Any feedback from the public during the review period of the Draft Basic Assessment Report (DBAR) will however be incorporated into further drafts of this report, if relevant.
- At the time of undertaking the visual study no information was available regarding the type and intensity of lighting required for the proposed development and therefore the potential impact of lighting at night has not been assessed at a detailed level. It is however assumed that operational and security lighting will be required for the proposed substation and general measures to mitigate the impact of additional light sources on the ambient nightscape have been provided accordingly.
- This study includes an assessment of the potential cumulative impacts of other renewable energy developments on the existing landscape character and on the identified sensitive receptors. This assessment is based on the information available at the time of writing the report and where information has not been available, broad assumptions have been made as to the likely impacts of these developments.
- No visualisation modelling was undertaken for the proposed development as this is not normally required for linear infrastructure. This can however be provided should the Public Participation process identify the need for this exercise.
- It should be noted that the site visits were undertaken during early spring (12th to 13th October 2021), which is characterised by relatively low levels of rainfall and reduced vegetation cover. In these conditions, increased levels of visual impact will be experienced from receptor locations in the surrounding area.
- Clear weather conditions tend to prevail throughout most of the year in this area, and in these clear conditions, power lines and associated infrastructure would present a greater contrast with the surrounding landscape than they would on a cloudy overcast day. Clear weather conditions were experienced during the field investigation and this factor was taken into consideration when undertaking this VIA.

2.5 Source of information

The main sources of information utilized for this VIA included:

- Project description for the proposed power line and substation development provided by Mainstream;
- Elevation data from 25m Digital Elevation model (DEM) from the National Geo-Spatial Information (NGI);
- 1:50 000 topographical maps of South Africa from the NGI;
- Land cover and land use data extracted from the 2020 South African National Land-Cover Dataset provided by GEOTERRAIMAGE;
- Vegetation classification data extracted from the South African National Biodiversity Institute's (SANBI's) VEGMAP 2018 dataset;
- Google Earth Satellite imagery 2021;
- South African Renewable Energy EIA Application Database from Department of Environmental Affairs (incremental release Quarter 2 2021);
- The National Web-Based Environmental Screening Tool, DFFE; and
- VIA for the proposed Kentani Solar PV Cluster, CSIR 2015.

3 LEGAL REQUIREMENT AND GUIDELINES

Key legal requirements pertaining to the proposed development are as follows:

In terms of the NEMA and the EIA Regulations 2014 (as amended), the proposed development includes listed activities which require a BA to be undertaken. As previously stated, the entire extent of the proposed 132kV overhead power line is located within one of the Strategic Transmission Corridors as defined and in terms of the procedures laid out in Government Notice (GN) No. 113, namely the Central Corridor. The proposed overhead power line and substation project irrespective would be subject to a BA process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the national Department of Environment, Forestry and Fisheries (DEFF).

As part of this BA process, the need for a VIA to be undertaken has been identified in order to assess the visual impact of the proposed grid connection infrastructure. The VIA must adhere to the requirements for specialist studies as stipulated in Appendix 6 of the NEMA EIA Regulations, 2014, as amended;

There is currently no legislation within South Africa that explicitly pertains to the assessment of visual impacts, however, in addition to the NEMA the following legislation has relevance to the protection of scenic resources:

- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003); and
- National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

Based on these Acts, protected or conservation areas and sites or routes with cultural or symbolic value have been taken into consideration when identifying sensitive and potentially sensitive receptor locations and rating the sensitivity of the study area.

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 Figure 1). The proposed project will be located on the following properties / farm portions:

- Remaining Extent of the Farm Klipfontein No. 305 (F0040000000030500000);
- The Farm Leliehoek No. 748 (F0040000000074800000);
- Remainder of the Farm Oxford No. 1030 (F00400000000103000000);
- Portion 1 of the Farm Walkerville No. 1031 (F0040000000103100001)³; and
- Remainder of the Farm Walkerville No. 1031 (F00400000000103100000).
- The Farm Overshot No. 31 (F0040000000003100000)

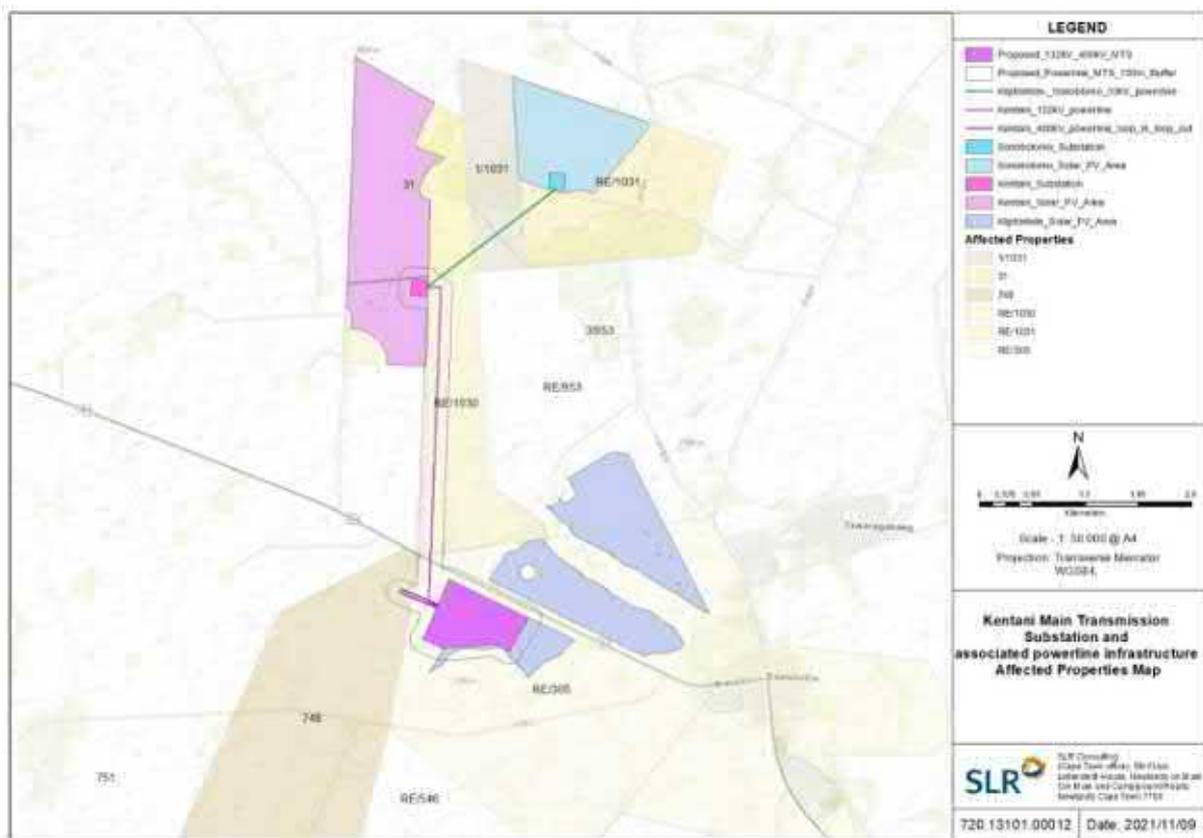


Figure 2: Affected Properties Map

³ 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.

The proposed MTS, BESS and powerlines are located within the within the Kimberly Renewable Energy Development Zone (REDZ)⁴ 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 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 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 2016¹.

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) will 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

⁴ GN R 786 of 2020: Notice of Identification in Terms of Section 24(5)(a) and (b) of 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.

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 Sonobloomo 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 3**.

Table 1: Summary of the key project components

Project Components	Location and size / extent (i.e., Farm Names and Areas)
Location	<ul style="list-style-type: none"> • 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 - F00400000000103100001³ • Remainder of the Farm Walkerville No. 1031 - F00400000000103100000³ • The Farm Overschot No. 31 - F00400000000003100000
Onsite Main Transmission Substation (MTS)	<ul style="list-style-type: none"> • 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 2016¹) 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 (<u>14/12/16/3/3/2/722</u>), which is proposed on Remaining Extent of the Farm Klipfontein No. 305
Grid Connection (Powerlines)	<ul style="list-style-type: none"> • 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 (<u>14/12/16/3/3/2/724</u>) (approx. 4km north-west of MTS site); • One (1) new 33kV overhead powerline connecting authorised 75MW Sonoblomo PV facility (<u>14/12/16/3/3/2/723</u>) (approx. 5km north of MTS site) to authorised Kentani on-site substation (<u>14/12/16/3/3/2/724</u>) (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	<ul style="list-style-type: none"> • One (1) new road in servitude under proposed powerlines • One (1) new access to the R64 provincial route

	<ul style="list-style-type: none">• Widths of up to approx. 4-8m
BESS	<ul style="list-style-type: none">• 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 as well as one (1) power line corridor routing for each of the associated proposed power lines, 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 power lines, no site, layout or power line 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 power lines 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 power lines being proposed as part of this BA process (i.e., this application) however fall outside of the authorised corridor.

The powerlines associated with the MTS which are being proposed 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

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.

The site layout being proposed is shown in the figure below (**Figure 3**).

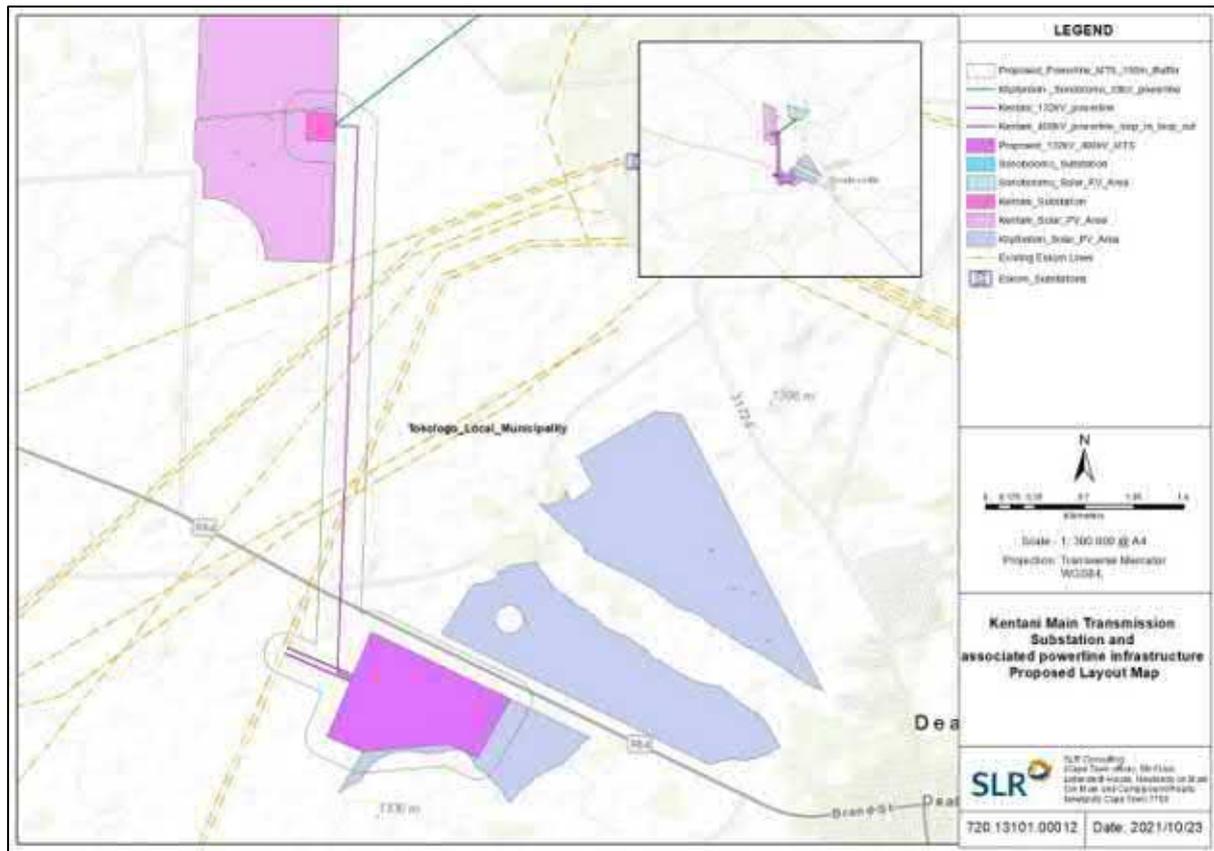


Figure 3: Proposed layout

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

5.1 Topography

The general area in the vicinity of the power line and substation assessment corridor is characterised by relatively flat to slightly undulating terrain (**Figure 4: View northwards across the study area** showing relatively flat terrain..



Figure 4: View northwards across the study area showing relatively flat terrain.

The power line and substation assessment corridors are characterised by relatively flat terrain no significant topographic features (**Figure 5** and **Figure 6**).

Maps showing the topography and slopes within and in the immediate vicinity of the combined assessment area are provided in **Figure 7** and **Figure 8** below.



Figure 5: View north-west across the power line assessment corridor showing gently undulating terrain.



Figure 6: View south across the proposed substation site from R64.

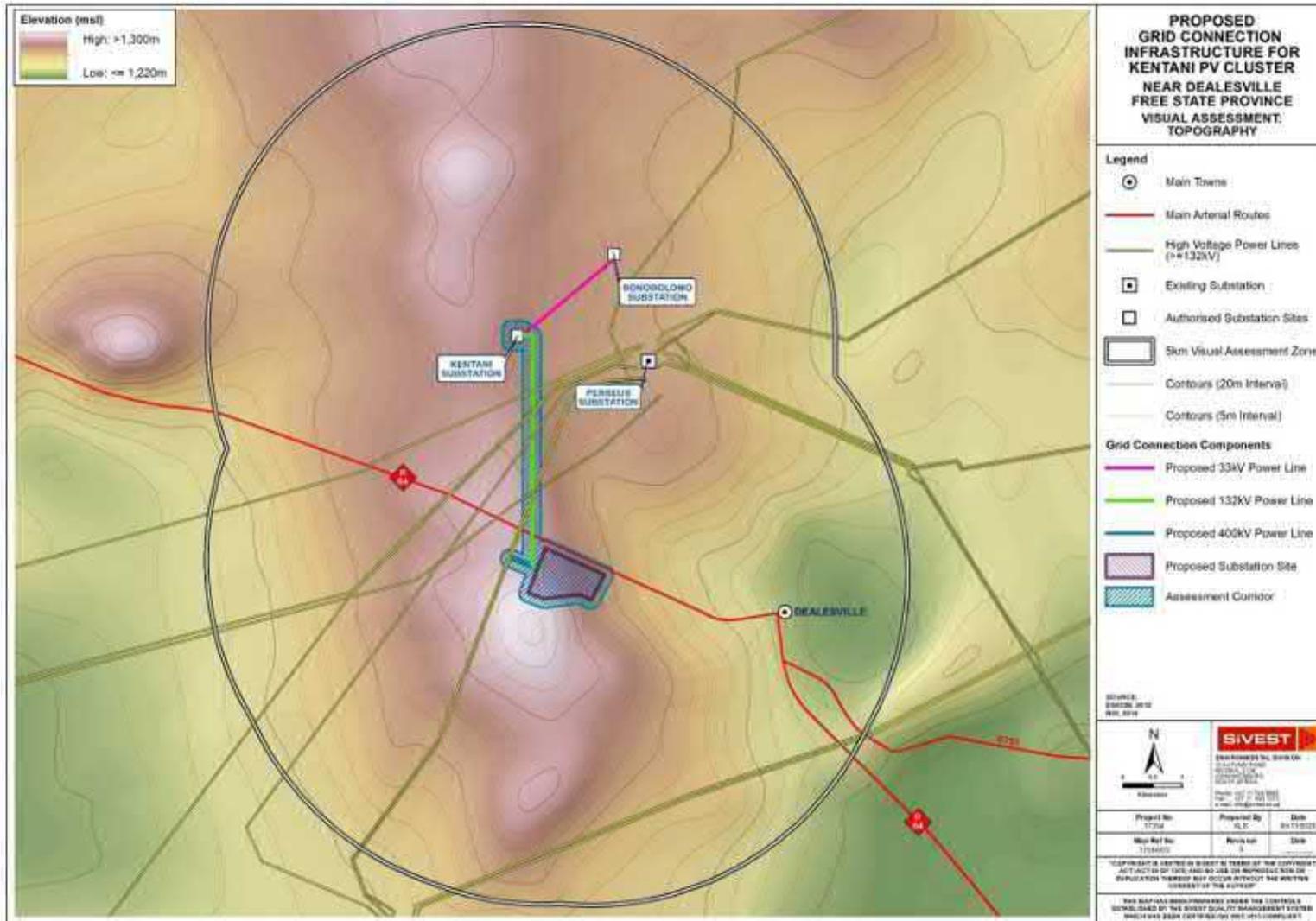


Figure 7: Topography within the study area

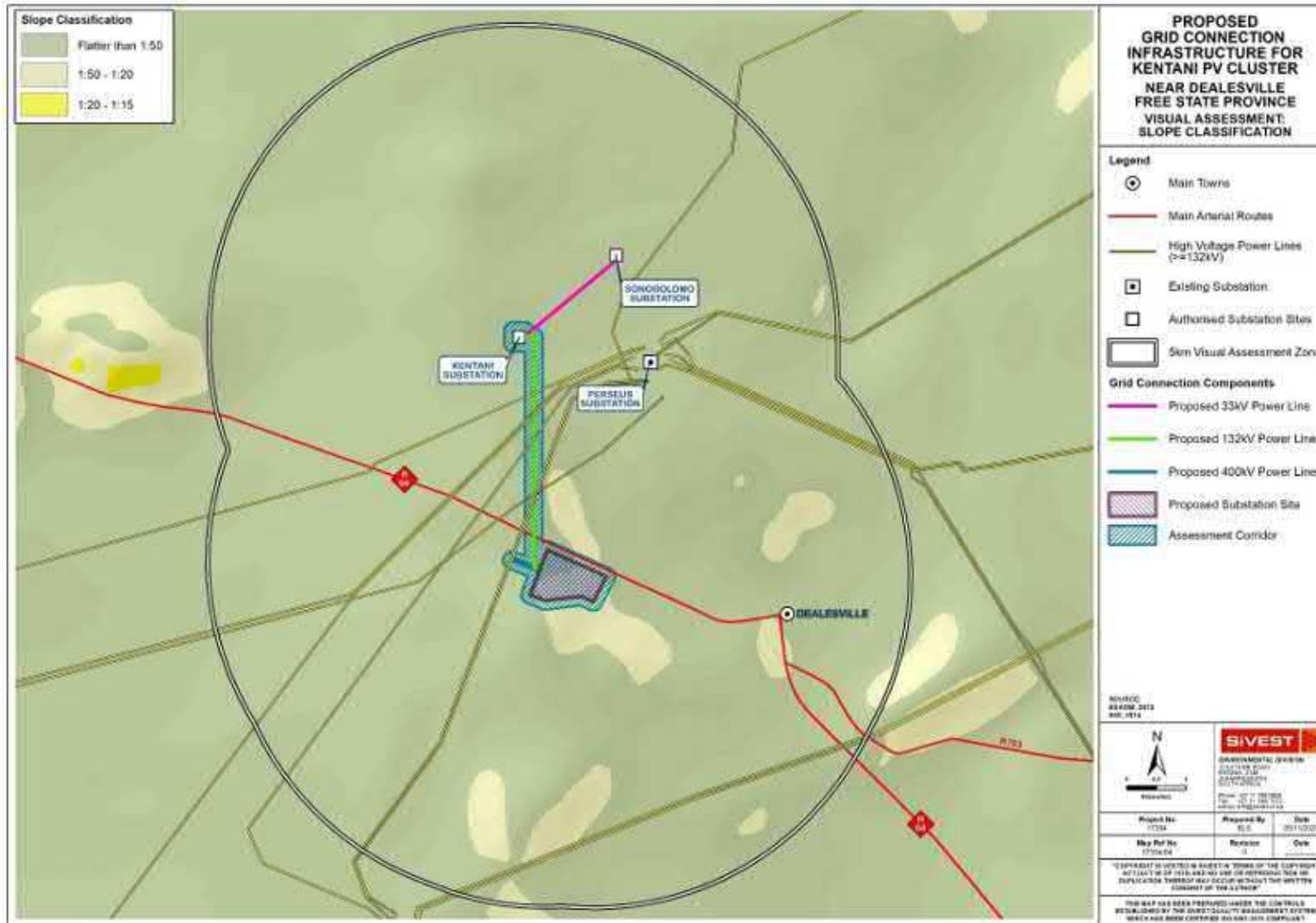


Figure 8: Slope Classification in the study area.

Visual Implications

Areas of flatter relief, including plains and slightly higher-lying plateaus are characterised by wide ranging vistas. Bearing in mind that power lines and substations are very large structures (potentially up to 22m in height), these structures could be visible from a considerable area around the site. Localised topographic variations may limit views of power line from some parts of the study area, but across the remainder of the study area there would be very little topographic shielding to lessen the visibility of the steel structures of the proposed on-site substation from many of the locally occurring receptor locations.

GIS technology was used to undertake a preliminary visibility analysis for the proposed power lines and substation based on the project information provided by Mainstream. This analysis was based on points placed at 250 m intervals along the centre line of the corridor alternatives, and the centre point of the substation site and assumes a tower height of 22 m. The resulting viewshed indicates the geographical area from where the proposed power lines and substation sites would theoretically be visible, i.e. the zone of visual influence or viewshed. This analysis is based entirely on topography (relative elevation and aspect) and does not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. In addition, detailed topographic data was not available for the broader study area and as such the viewshed analysis does not take into account any localised topographic variations which may constrain views. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.

The results of this analysis, as per **Figure 9** below, show that elements of the proposed grid connection infrastructure would be highly visible from many parts of the study area, and very few areas are outside the viewshed for the proposed power lines and substation site.

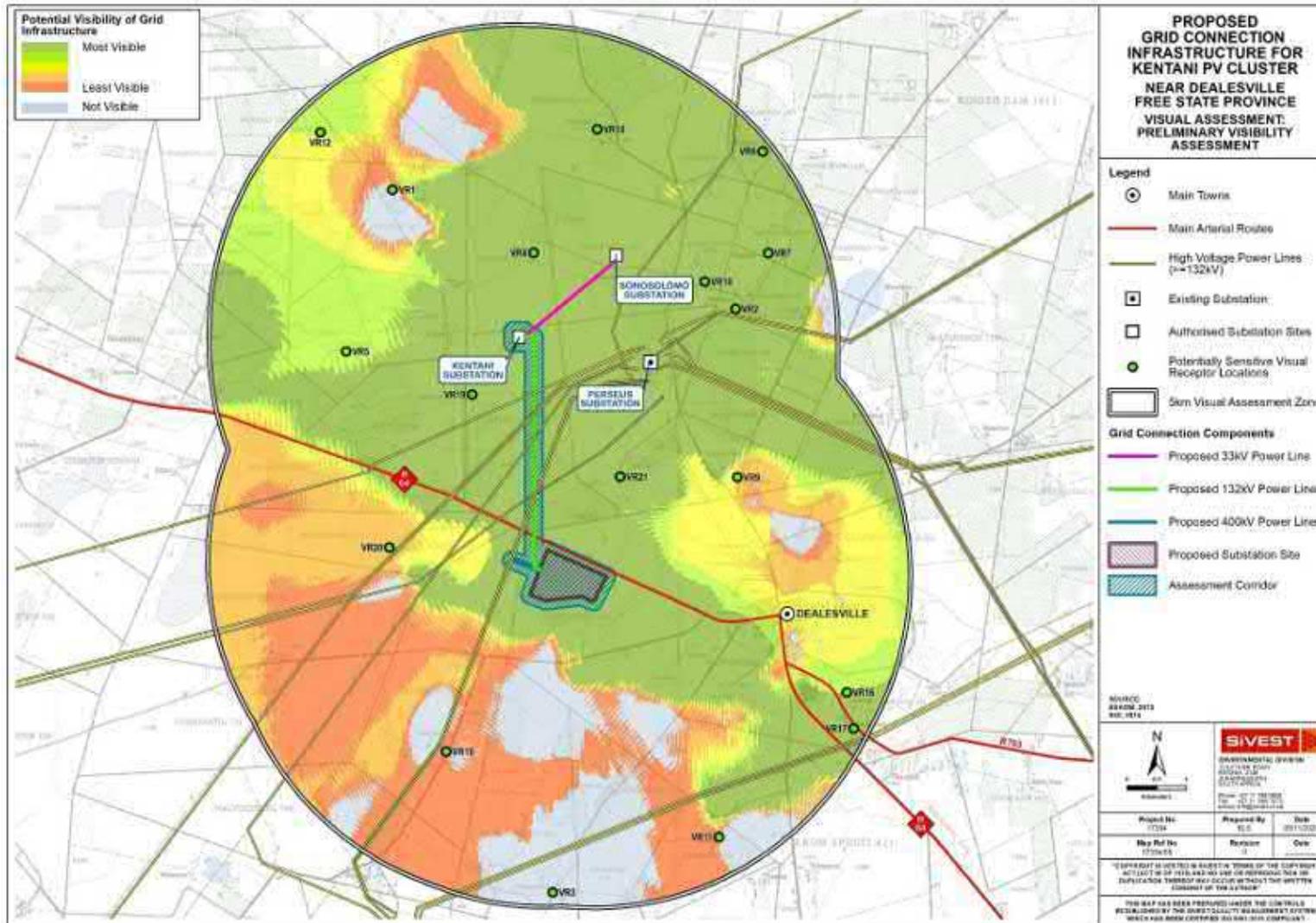


Figure 9: Potential visibility of power lines and substation.

5.2 Vegetation

According to Mucina and Rutherford (2012), much of study area is covered by the Vaal-Vet Sandy Grassland vegetation type, which tends to occur plains-dominated landscapes. This vegetation type largely comprises low tussock grassland (**Figure 10**) with an abundant karroid element. Also present in the south-eastern and south-western sectors of the study area is the Western Free State Clay Grassland vegetation type which is commonly found in flat bottomlands which support dry, species-poor grassland with embedded salt pans (Playas).



Figure 10: Grasslands typical across much of the study area.

Significant areas of the natural vegetation cover have however been partly removed or transformed by cultivation as well as the presence of tall exotic trees scattered in clusters across the study area and around farmsteads (**Figure 11** and **Figure 12**).

Vegetation classifications across the study area are shown below.



Figure 11: Example of scattered trees in the landscape.



Figure 12: Tall trees providing screening around a farm house north-east of the power line assessment corridor.

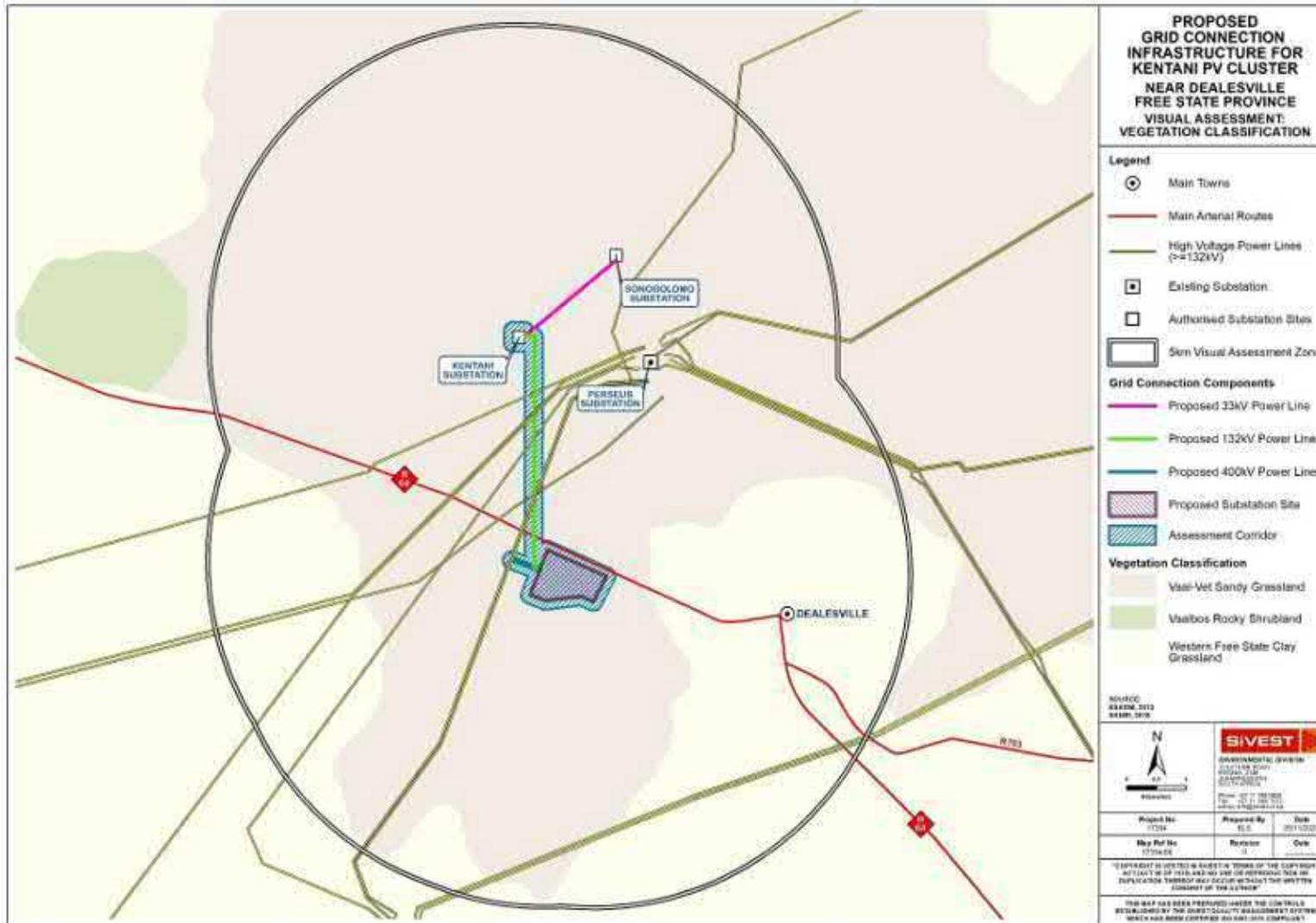


Figure 13: Vegetation Classification in the study area.

Visual Implications

The proposed development will contrast significantly with the predominant vegetative cover in the area, although scattered trees and shrubs will provide some limited degree of screening. However, tall trees planted around farmhouses in the area may restrict views from these receptor locations thus potentially reducing impacts experienced by the potentially sensitive receptors in the area.

5.3 Land Use

According to the South African National Land Cover dataset (Geoterraimage 2020), much of the visual assessment area is classified as “Grassland” interspersed with significant areas of “Cultivation”. Small tracts of forested land and numerous water bodies are scattered throughout the study area (**Figure 14**).

Commercial agriculture is the dominant activity in much of the study area, with the main focus being maize cultivation (**Figure 15**) and livestock grazing. Farm properties in much of the study area are relatively large, resulting in a low density of rural settlement characterised by scattered farmsteads. Built form associated with these areas is limited to farmsteads (**Figure 16**), including farm worker’s dwellings and ancillary farm buildings, gravel access roads, telephone and electricity lines and fences.

High levels of human influence are however visible in the eastern sector of the study area. Perseus Substation (**Figure 17**) located to the east of the assessment corridor is a prominent anthropogenic feature in the landscape. In addition, the extensive network of high voltage power lines associated with this substation and with Beta Substation to the south, forms a major visual component in the landscape (**Figure 18**).

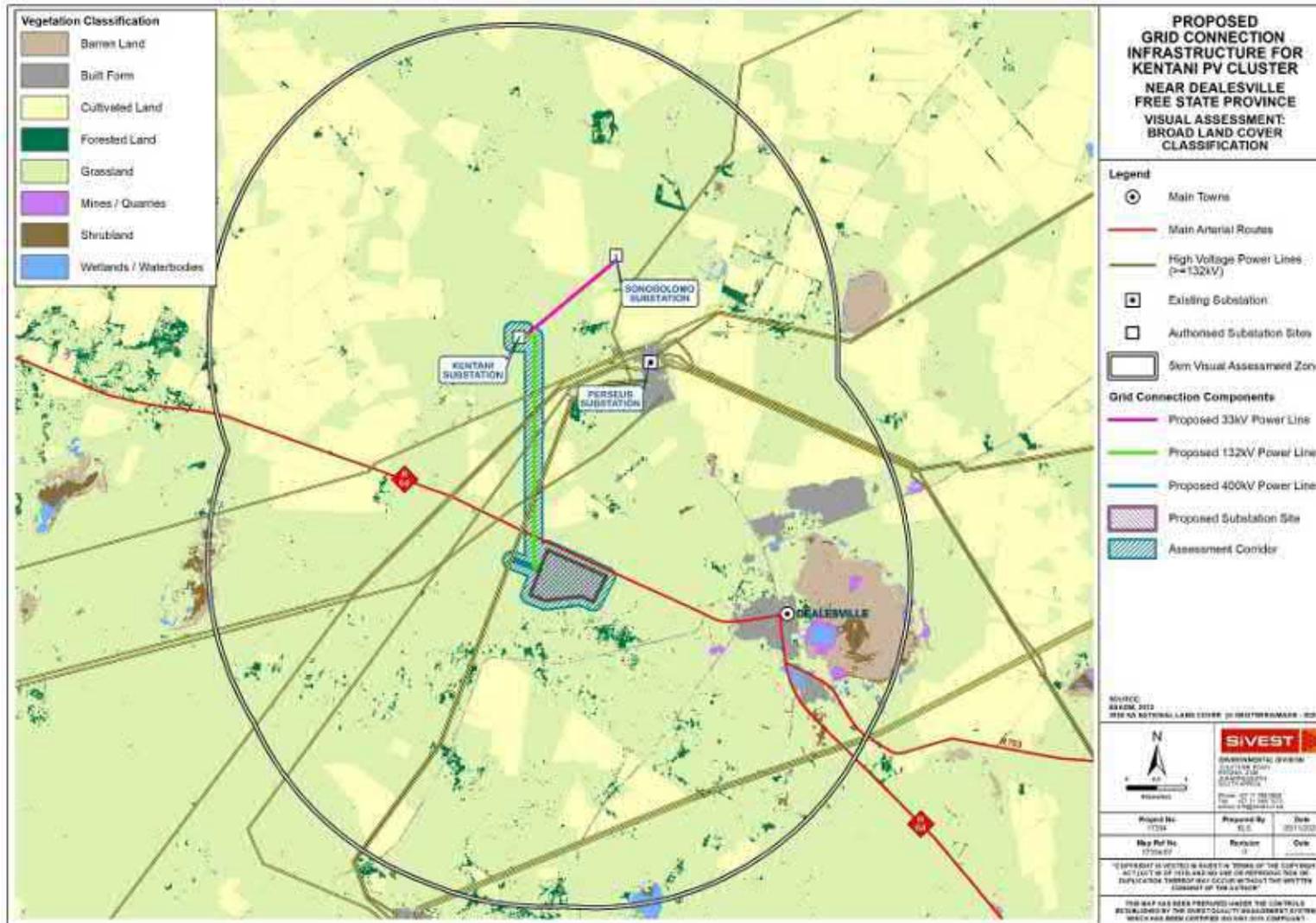


Figure 14: Land Cover Classification in the study area.



Figure 15: Cultivated land north of Perseus Substation.



Figure 16: Typical farmstead located east of the power line assessment corridor.



Figure 17: High voltage power lines feeding into Perseus Substation.



Figure 18: High voltage power lines in the vicinity of the assessment corridor.

The town of Dealesville, located in the south-eastern sector of the study area, is a small agricultural service centre that includes the town of Dealesville (**Figure 19**) with associated road and electricity / telecommunications infrastructure. To the north-east of Dealesville is the Tswaraganang Township with

associated residential development and electricity infrastructure (**Figure 20**). The visual character of these urban and peri-urban areas is significantly degraded and the level of degradation has been exacerbated by the presence of a refuse dumping site located on the outskirts the town. The refuse site and the litter around the site (**Figure 21**) contribute to the overall disturbed nature of the area.

Other significant anthropogenic elements in the landscape include the R64 main road which traverses the study area in a north-west / south-east direction. (**Figure 22**).



Figure 19: Centre of Dealesville.



Figure 20: View of Tswaraganang Township to the north-east of Dealesville town centre.



Figure 21: Litter in the vicinity of the Dealesville refuse dump.



Figure 22: R64 Main road heading south-east towards Dealesville.

Visual Implications

The relatively low density of human habitation and presence of natural vegetation cover across large portions of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements resulting from cultivation and livestock farming. High levels of human transformation and visual degradation become evident however in the southern sector of the study area where extensive electrical infrastructure, including Perseus Substation and associated high voltage power lines are prominent features in the landscape. In addition, the urban / peri-urban development in and around Dealesville and Tswaraganang Township have significantly altered the visual character in this sector of the study area and resulted in a general degradation of the landscape, extending into the urban periphery.

Hence, the visual impacts associated with the proposed development are expected to be relatively insignificant in these areas as they have already undergone significant transformation and degradation.

The influence of the level of human transformation on the visual character of the area is described in more detail below.

5.4 Visual Character and Cultural Value

The physical and land use-related characteristics of the study area as described above contribute to its overall visual character. Visual character largely depends on the level of change or transformation from a natural baseline in which there is little evidence of human transformation of the landscape. Varying degrees of human transformation of a landscape would engender differing visual characteristics to that landscape, with a highly modified urban or industrial landscape being at the opposite end of the scale to a largely natural, undisturbed landscape. Visual character is also influenced by the presence of built infrastructure including buildings, roads and other objects such as telephone or electrical infrastructure. The visual character of an area largely

determines the **sense of place** relevant to the area. This is the unique quality or character of a place, whether natural, rural or urban which results in a uniqueness, distinctiveness or strong identity.

As mentioned above, much of the study area is characterised by rural areas with natural unimproved vegetation. Agriculture in the form of cultivation and livestock rearing is the dominant land use, which has transformed the natural vegetation in many areas. However, significant portions of the study area have retained a natural appearance due to the presence of grasslands and as such the introduction of electrical infrastructure into this environment could be considered to be a degrading factor.

In this instance however, much of the landscape has already been transformed by the presence of Perseus Substation and the associated power line network. This infrastructure, in conjunction with the urban infrastructure of Dealesville, has resulted in an increasingly industrial landscape character and a high degree of visual degradation. The more industrial character of the landscape is an important factor in this context, as the introduction of the proposed power line would result in less visual contrast where other anthropogenic elements are already present, especially where the scale of those elements is similar to that of the proposed development.

Cultural landscapes are becoming increasingly important concepts in terms of the preservation and management of rural and urban settings across the world. The concept of 'cultural landscape' is a way of looking at a place that focuses on the relationship between human activity and the biophysical environment (Breedlove, 2002). In this instance, the rural / pastoral landscape represents how the environment has shaped the predominant land use and economic activity practiced in the area, as well as the patterns of human habitation and interaction. The presence of small towns, such as Dealesville, engulfed by an otherwise rural / pastoral environment, form an integral part of the wider landscape.

In light of this, it is important to assess whether the introduction of a new power line and substation into the study area would be a degrading factor in the context of the prevailing character of the cultural landscape. Broadly speaking, visual impacts on the cultural landscape in this area would be greatly reduced by the presence of Perseus Substation and an extensive network of high voltage power lines in the area.

5.5 Visual Absorption Capacity

Visual absorption capacity is the ability of the landscape to absorb a new development without any significant change in the visual character and quality of the landscape. The level of absorption capacity is largely based on the physical characteristics of the landscape (topography and vegetation cover) and the level of transformation present in the landscape.

Although the relatively flat topography in the study area and the predominant grassland would reduce the visual absorption capacity, this would be offset to a considerable degree by the extensive electrical infrastructure already present in the landscape as well as the urban and peri-urban development in the south-east of the study area.

Visual absorption capacity in the study area is therefore rated as **high**.

5.6 Sensitive Visual Receptors

A sensitive visual receptor location is defined as a location from where receptors would potentially be impacted by a proposed development. Adverse impacts often arise where a new development is seen as an intrusion which alters the visual character of the area and affects the 'sense of place'. The degree of visual impact experienced will however vary from one receptor to another, as it is largely based on the viewer's perception.

A distinction must be made between a receptor location and a sensitive receptor location. A receptor location is a site from where the proposed development may be visible, but the receptor may not necessarily be adversely affected by any visual intrusion associated with the development. Less sensitive receptor locations include locations of commercial activities and certain movement corridors, such as roads that are not tourism routes. More sensitive receptor locations typically include sites that are likely to be adversely affected by the visual intrusion of the proposed development. They include tourism facilities, scenic sites and residential dwellings in natural settings.

The identification of sensitive receptors is typically based on a number of factors which include:

- the visual character of the area, especially taking into account visually scenic areas and areas of visual sensitivity;
- the presence of leisure-based (especially nature-based) tourism in an area;
- the presence of sites or routes that are valued for their scenic quality and sense of place;
- the presence of homesteads / farmsteads in a largely natural setting where the development may influence the typical character of their views; and
- feedback from interested and affected parties, as raised during the public participation process conducted as part of the BA study.

Viewing distance is also a critical factor in the experiencing of visual impacts. As the visibility of the development would diminish exponentially over distance, receptor locations which are closer to the proposed development would experience greater adverse visual impacts than those located further away.

The degree of visual impact experienced will however vary from one inhabitant to another, as it is largely based on the viewer's perception. Factors influencing the degree of visual impact experienced by the viewer include the following:

- Value placed by the viewer on the natural scenic characteristics of the area.
- The viewer's sentiments toward the proposed structures. These may be positive (a symbol of progression toward a less polluted future) or negative (foreign objects degrading the natural landscape).
- Degree to which the viewer will accept a change in the typical landscape character of the surrounding area.

5.6.1 Receptor Identification

Preliminary desktop assessment of the study area identified eighteen (18) potentially sensitive visual receptor locations within a five km radius of the power line / substation assessment corridor, most of which appear to be existing farmsteads. Although the findings of the desktop assessment were largely confirmed during the field investigation, it was not possible to confirm the presence of receptors at all the identified locations due to access restrictions. Notwithstanding this limitation, all the identified receptor locations were assessed as

part of the VIA as they are still regarded as being potentially sensitive to the visual impacts associated with the proposed development.

Although the identified receptor locations are all believed to be farmsteads, they are regarded as *potentially sensitive* visual receptors as the proposed development will likely alter natural or semi-natural vistas experienced from these locations. At this stage however, local sentiments towards the proposed development are not known. Three of these farmsteads were found to be outside the preliminary viewshed for the proposed power line and substation and none of the remaining receptors was identified as being sensitive.

Although the residences in Dealesville and Tswaraganang Township could be considered to be receptors, they are not considered to be sensitive due to their location within built-up, heavily transformed areas. As such, they are not expected to perceive the proposed development in a negative light and this would reduce the level of visual impact experienced at these locations.

In many cases, roads along which people travel are regarded as sensitive receptors. The primary thoroughfare in the study area is the R64 Main road which traverses the study area in a north-west / south-east direction, linking Bloemfontein in the east with Kimberley to the west. The section of the road traversing the study area is not considered part of a designated scenic route, although the route is an important link and is likely to be utilised, to some extent, by tourists en route to the Northern Cape. As a result, the road is considered to be a potentially sensitive receptor road – i.e. a road being used by motorists who may object to the potential visual intrusion of the proposed power line and substation development.

The R703 Main Road and other thoroughfares in the study area are primarily used as local access roads and do not form part of any scenic tourist routes. These roads are not specifically valued or utilised for their scenic or tourism potential and are therefore not regarded as visually sensitive.

No protected areas were identified within 5kms of the power line / substation assessment corridor.

The potentially sensitive visual receptor locations identified within the study area for the proposed power line and substation are indicated in **Figure 23**.

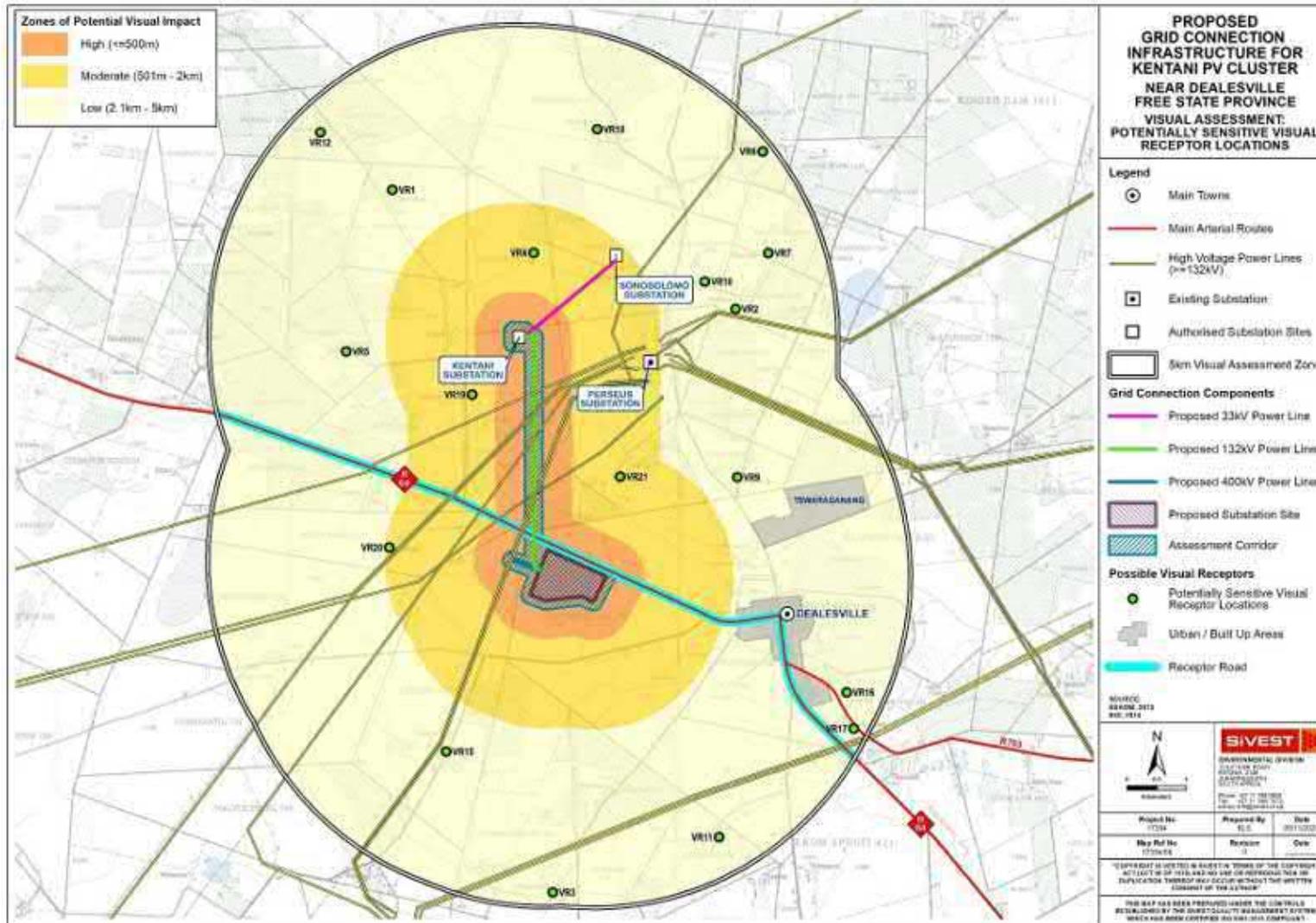


Figure 23: Potentially sensitive visual receptor locations.

5.6.2 Receptor Impact Rating

In order to assess the impact of the proposed development on the identified potentially sensitive receptor locations, a matrix that takes into account a number of factors has been developed and is applied to each receptor location.

The matrix is based on the factors listed below:

- Distance of a receptor location away from the proposed development (zones of visual impact)
- Presence of screening elements (topography, vegetation etc.)
- Visual contrast of the development with the landscape pattern and form.

These are considered to be the most important factors when assessing the visual impact of a proposed development on a potentially sensitive receptor location in this context. It should be noted that this rating matrix is a relatively simplified way of assigning a likely representative visual impact, which allows a number of factors to be considered. Experiencing visual impacts is however a complex and qualitative phenomenon, and is thus difficult to quantify accurately. The matrix should therefore be seen as a representation of the likely visual impact at a receptor location. Part of its limitation lies in the quantitative assessment of what is largely a qualitative or subjective impact.

As described above, the distance of the viewer / receptor location from the development is an important factor in the context of experiencing visual impacts which will have a strong bearing on mitigating the potential visual impact. A high impact rating has been assigned to receptor locations that are located within 500m of the elements of the proposed development. The visual impact of the proposed development beyond 5km would be negligible as the development would appear to merge with the elements on the horizon. Any visual receptor locations beyond these distance limits have therefore not been assessed as they fall outside the study area and would not be visually influenced by the proposed development.

At this stage of the process, zones of visual impact for the proposed development have been delineated according to distance from the power line / substation assessment corridor. Based on the assumed height and scale of the development, the distance intervals chosen for the zones of visual impact, as shown in **Figure 23**, are as follows:

- 0 – 500m (high impact zone);
- 500m –2km (moderate impact zone);
- 2km - 5km (low impact zone).

The presence of screening elements is an equally important factor in this context. Screening elements can be vegetation, buildings and topographic features. For example, a grove of trees or a series of low hills located between a receptor location and an object could completely shield the object from the receptor.

The visual contrast of a development refers to the degree to which the development would be congruent with the surrounding environment. This is based on whether or not the development would conform to the land use, settlement density, structural scale, form and pattern of natural elements that define the structure of the surrounding landscape. Visual compatibility is an important factor to be considered when assessing the impact of the development on receptors within a specific context. A development that is incongruent with the

surrounding area could change the visual character of the landscape and have a significant visual impact on sensitive receptors.

In order to determine the likely visual compatibility of the proposed development, the study area was classified into the following zones of visual contrast:

- **High** – undeveloped / natural / rural areas.
- **Moderate** –
 - areas within 500m of existing power lines ($\geq 88\text{kV}$);
 - areas within 250m of main roads;
 - cultivated areas and plantations.
- **Low** –
 - areas within 500m of urban / built-up areas;
 - areas within 500m of Perseus Substation;

These zones are depicted in **Figure 24** below.

Based on the above criteria, the receptor impact rating matrix returns a score which in turn determines the visual impact rating assigned to each receptor location (**Table 2**) below.

Table 2: Rating Scores

Rating	Overall Score
High Visual Impact	8-9
Moderate Visual Impact	5-7
Low Visual Impact	3-4
Negligible Visual Impact	(overriding factor)

An explanation of the matrix is provided in **Table 3** below.

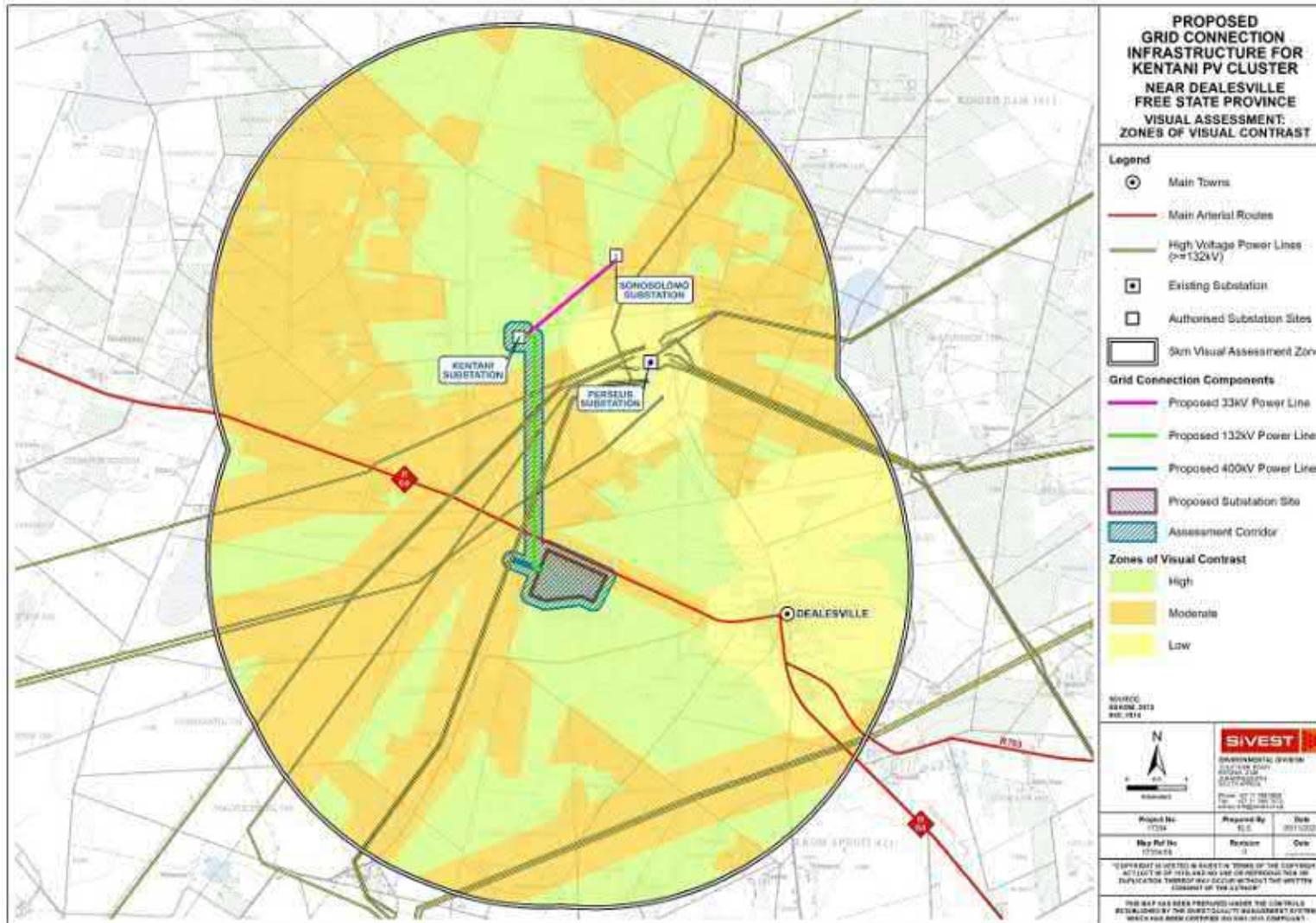


Figure 24: Zones of visual contrast.

Table 3: Visual assessment matrix used to rate the impact of the proposed development on potentially sensitive receptors

VISUAL IMPACT RATING				
VISUAL FACTOR	HIGH	MODERATE	LOW	OVERRIDING FACTOR: NEGLECTIBLE
Distance of receptor away from proposed development	<= 500m Score 3	500m - 2km Score 2	2km - 5km Score 1	>5km
Presence of screening factors	No / almost no screening factors – development highly visible Score 3	Screening factors partially obscure the development Score 2	Screening factors obscure most of the development Score 1	Screening factors completely block any views towards the development, i.e. the development is not within the viewshed
Visual Contrast	High contrast with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) Score 3	Moderate contrast with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) Score 2	Corresponds with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) Score 1	

Table 4 below presents a summary of the overall visual impact of the proposed 132kV power line and substation on each of the potentially sensitive visual receptor locations identified within 5kms of the proposed development.

Table 4: Receptor impact rating for the proposed power lines and substation

Receptor Location	Distance to Corridor		Screening		Contrast		OVERALL IMPACT RATING		
	KM	Rating	Rating	Rating	Rating	Rating	Rating		
VR1 - Farmstead *	NIL								
VR2 - Farmstead	2.2	Low	1	Low	1	Mod	2	LOW	4
VR3 - Farmstead *	NIL								
VR4 - Farmstead	0.9	Mod	2	Mod	2	Mod	2	MODERATE	6
VR5 - Farmstead	2.9	Low	1	Mod	2	Mod	2	MODERATE	5
VR6 - Farmstead	3.2	Low	1	Low	1	High	3	MODERATE	5
VR7 - Farmstead	2.6	Low	1	Low	1	High	3	MODERATE	5
VR9 - Farmstead	3.2	Low	1	Low	1	Mod	2	LOW	4
VR10 - Farmstead	1.5	Mod	2	Low	1	Mod	2	MODERATE	5
VR11 - Farmstead*	NIL								
VR12 - Farmstead	4.7	Low	1	Mod	2	Mod	2	MODERATE	5
VR15 - Farmstead	2.2	Low	1	Low	1	Low	1	LOW	3
VR16 - Farmstead	5.0	Low	1	Low	1	Low	1	LOW	3
VR17 - Farmstead	5.4	Low	1	Low	1	Mod	2	LOW	4
VR18 - Farmstead	3.5	Low	1	Low	1	High	3	MODERATE	5
VR19 - Farmstead	0.9	Mod	2	High	3	Mod	2	MODERATE	7
VR20 - Farmstead	1.9	Mod	2	Mod	2	Mod	2	MODERATE	6
VR21 - Farmstead	3.5	Low	1	Mod	2	Mod	2	MODERATE	5

*Receptor is outside the preliminary viewshed and as such the overall impact rating is "NIL"

The table above shows that three of the identified receptors are outside the viewshed for the development and none of the remaining receptors is expected to experience high levels of visual impact as a result of the proposed development. Ten of the remaining receptor locations are expected to experience moderate levels of impact as a result of the power line and substation development, while five receptors will only experience low levels of visual impact.

As stated above, the R64 main road could be considered as a potentially sensitive receptor road. Elements of the power line / substation development are expected to be visible to motorists travelling along the R64, but the likely visual impacts of the proposed development on motorists would be reduced by the level of transformation and landscape degradation already visible from this route. In light of this, visual impacts affecting the R64 are rated as **low**.

5.7 Night Time Impacts

The visual impact of lighting on the nightscape is largely dependent on the existing lighting present in the surrounding area at night. The night scene in areas where there are numerous light sources will be visually degraded by the existing light pollution and therefore additional light sources are unlikely to have a significant impact on the nightscape. In contrast, introducing new light sources into a relatively dark night sky will impact on the visual quality of the area at night. It is thus important to identify a night-time visual baseline before exploring the potential visual impact of the proposed wind farm at night.

The urban areas of Dealesville and Tswaraganang Township, located approximately 3 km east of the proposed MTS site is the main source of light within the study area. These areas are expected to have a significant impact on the night scene in the eastern sector of the study area. Another prominent light source within the study area at night is the security lighting at the existing Perseus Substation which is expected to be visible from relatively far away.

Power lines and associated towers or pylons are not generally lit up at night and, thus light spill associated with the proposed electrical infrastructure project is only likely to emanate from the proposed MTS. Although the lighting required at the substation site would normally be expected to intrude on the nightscape, night time impacts of this lighting will be reduced by the existing light spill emanating from Dealesville and Tswaraganang Township as well as Perseus Substation. It should also be noted that the power line and substation will only be constructed if the proposed Kentani PV Cluster is also developed. Light sources for this facility will include operational and security lighting and thus the lighting impacts from the proposed substation would be subsumed by the glare and contrast of the lighting associated with the facility as a whole. As such, the substation alone is not expected to result in significant lighting impacts.

6 SENSITIVITY MAPPING

Visual sensitivity can be defined as the inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (i.e. topography, landform and land cover), the spatial distribution of potential receptors, and the likely value judgements of these receptors towards a new development (Oberholzer: 2005). A viewer's perception is usually based on the perceived aesthetic appeal of an area and on the presence of economic activities (such as recreational or nature-based tourism) which may be based on this aesthetic appeal.

In order to assess the visual sensitivity of the broader area, SiVEST has developed a matrix based on the characteristics of the receiving environment which, according to the Guidelines for Involving Visual and Aesthetic Specialists in the EIA Processes, indicate that visibility and aesthetics are likely to be 'key issues' (Oberholzer: 2005).

Based on the criteria in the matrix (**Table 5**), the visual sensitivity of the area is broken up into a number of categories, as described below:

- i) **High** - The introduction of a new development such as a power line and/or substation would be likely to be perceived negatively by receptors in this area; it would be considered to be a visual intrusion and may elicit opposition from these receptors.

- ii) **Moderate** – Receptors are present, but due to the nature of the existing visual character of the area and likely value judgements of receptors, there would be limited negative perception towards the new development as a source of visual impact.
- iii) **Low** - The introduction of a new development would not be perceived to be negative, there would be little opposition or negative perception towards it.

The table below outlines the factors used to rate the visual sensitivity of the study area. The ratings are specific to the visual context of the receiving environment within the study area.

Table 5: Environmental factors used to define visual sensitivity of the study area

FACTORS	DESCRIPTION	RATING											
		1	2	3	4	5	6	7	8	9	10		
Pristine / natural / scenic character of the environment	Study area is largely natural with areas of scenic value and some pastoral elements.												
Presence of sensitive visual receptors	Relatively few sensitive receptors have been identified in the study area.												
Aesthetic sense of place / visual character	Visual character is typical of a rural / pastoral landscape.												
Irreplaceability / uniqueness / scarcity value	Few areas of scenic value within the study area.												
Cultural or symbolic meaning	Much of the area is typical of a rural / pastoral landscape.												
Protected / conservation areas in the study area	No protected or conservation areas were identified in the study area.												
Sites of special interest present in the study area	No sites of special interest were identified in the study area.												
Economic dependency on scenic quality	No tourism/leisure based facilities in the area												
International / regional / local status of the environment	-												
**Scenic quality under threat / at risk of change	Introduction of a power line and MTS infrastructure will alter the visual character and sense of place, increasing the level of transformation in the area and giving rise to significant cumulative impacts												

****Any rating above '5' for this specific aspect will trigger the need to undertake an assessment of cumulative visual impacts.**

Low			Moderate				High		
10	20	30	40	50	60	70	80	90	100

Based on the above factors, the total score for the study area is 33, which according to the scale above, would result in the area being rated as having a **low** level of visual sensitivity. It should be stressed however that the concept of visual sensitivity has been utilised indicatively to provide a broad-scale indication of whether the landscape is likely to be sensitive to visual impacts, and is based on the physical characteristics of the study area, economic activities and land use that predominates. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs and this has been factored into the sensitivity rating above.

As part of the visual sensitivity assessment, a screening exercise was undertaken with the aim of indicating any areas that should be precluded from the proposed development footprint. From a visual perspective, these are areas where the establishment of power lines and/or substation infrastructure would result in the greatest probability of visual impacts on sensitive or potentially sensitive visual receptors.

Using GIS-based visibility analysis, it was possible to determine which sectors of the assessment corridors would be visible to the highest numbers of receptors in the study area. However, this analysis found that no areas on the substation site or along the proposed route alignment are *significantly* more visible than any other area. As such, in terms of visibility, no areas were found to be particularly sensitive.

In determining visual sensitivity, consideration must also be given to the direct visual impact of the proposed development on any nearby farmsteads or receptors. However, investigation determined that there are no farmsteads or potentially sensitive receptors within 500 m of any elements of the power line or MTS development. As such, no areas of visual sensitivity were identified in relation to any of the power line alignments or the substation site.

6.1 Sensitivities identified by the National Screening Tool

In assessing visual sensitivity, the proposed development was examined in relation to the Landscape Theme of the National Environmental Screening Tool to determine the relative landscape sensitivity for this type of development. The tool does not however identify any landscape sensitivities in this respect.

7 SPECIALIST FINDINGS ASSESSMENT OF IMPACTS

This VIA has identified the potential issues / impacts that could result from the proposed development of a substation, power lines and access roads as proposed. It should be noted however that the visual impacts of the proposed access roads are generally not regarded as a significant factor when compared to the visual impact associated with the power lines and MTS. A summary of these issues / impacts is presented below.

Construction Phase

- Potential visual intrusion resulting from large construction vehicles and equipment;
- Potential visual effect of construction activities;
- Potential visual effect of material stockpiles;
- Potential impacts of increased dust emissions from construction activities and related traffic;

- Potential visual scarring of the landscape as a result of surface disturbance during construction; and
- Potential visual pollution resulting from littering on the construction site.

Operational Phase

- Potential alteration of the visual character of the area;
- Potential visual intrusion resulting from power line and substation infrastructure dominating the skyline in a largely natural / rural area;
- Potential impacts of increased dust emissions from maintenance activities and related traffic;
- Potential visual effect on surrounding farmsteads; and
- Potential alteration of the night time visual environment as a result of operational and security lighting at the proposed substation.

Decommissioning Phase

- Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process;
- Potential impacts of increased dust emissions from decommissioning activities and related traffic; and
- Potential visual intrusion of any remaining infrastructure on the site.

Cumulative Impacts

- Combined visual impacts from proposed renewable energy developments and existing electrical infrastructure in the broader area could further alter the sense of place and visual character of the area;
- Additional electrical infrastructure in the area would increase the visual clutter in the area; and
- Combined visual impacts from proposed renewable energy developments and existing electrical infrastructure in the broader area could potentially exacerbate visual impacts on visual receptors.

7.1 Impact assessment

The EIA Regulations, 2014 (as amended) require that an overall rating for visual impact be provided to allow the visual impact to be assessed alongside other environmental parameters. The impact matrices for visual impacts associated with the proposed construction, operation and decommissioning of the proposed power lines and substation are presented below together with recommended mitigation measures. The mitigation measures have been determined based on best practice and literature reviews.

Please refer to **Appendix B (Terms of Reference)** for an explanation of the impact rating methodology.

7.1.1 Impacts during Construction Phase

Table 6: Rating of Impacts of Proposed Power Line, MTS, BESS and Access Roads During Construction

<p>Issue:</p> <ul style="list-style-type: none"> ▪ Potential alteration of the visual character and sense of place ▪ Potential visual impact on receptors in the study area
<p>Description of Impact</p>
<ul style="list-style-type: none"> ▪ Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. ▪ Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from increased traffic on gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.

<ul style="list-style-type: none"> ▪ Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. ▪ Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. ▪ Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact. 		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Short-term	Short-term
Extent	Site	Site
Consequence	Low	Very Low
Probability	Probable	Probable
Significance	Low -	Low -
Degree to which impact can be reversed	Impacts are completely reversible with cessation of construction activity.	
Degree to which impact may cause irreplaceable loss of resources	Marginal loss of visual resources without mitigation measures.	
Degree to which impact can be mitigated	There is significant scope for mitigation as per the recommended mitigation measures below.	
The following measures are recommended:	<ul style="list-style-type: none"> ▪ Carefully plan to minimise the construction period and avoid construction delays. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the construction site, where possible. ▪ Unless there are water shortages, ensure that dust suppression techniques are implemented: <ul style="list-style-type: none"> ○ on all access roads; ○ in all areas where vegetation clearing has taken place; ○ on all soil stockpiles. 	
The following monitoring is recommended:	<ul style="list-style-type: none"> ▪ Ensure that visual management measures are monitored by an ECO. This will include monitoring activities associated with visual impacts such as the siting and management of soil stockpiles, screening and dust suppression. ▪ Regular reporting to an environmental management team must also take place during the construction phase. 	
Nature of cumulative impacts	<ul style="list-style-type: none"> ▪ Combined visual impacts from construction activities associated with the development of multiple renewable energy and grid connection infrastructure projects in the broader area could further alter the sense of place and visual character of the area; and ▪ Combined visual impacts from construction activities associated with the development of multiple renewable energy and grid connection infrastructure projects in the broader area could potentially exacerbate visual impacts on visual receptors. 	

Rating of cumulative impacts	Without Mitigation	With Mitigation
	Medium -	Low -

7.1.2 Impacts during Operation Phase

Table 7: Rating of Impacts of Proposed Power Line, MTS, BESS and Access Roads During Operation

Issue: <ul style="list-style-type: none"> ▪ Potential alteration of the visual character and sense of place ▪ Potential visual impact on receptors in the study area. 		
Description of Impact		
<ul style="list-style-type: none"> ▪ Potential alteration of the visual character of the area; ▪ Potential visual intrusion resulting from power line and substation infrastructure dominating the skyline in a largely natural / rural area; ▪ Potential impacts of increased dust emissions from maintenance activities and related traffic; ▪ Potential visual effect on surrounding farmsteads; and ▪ Potential alteration of the night time visual environment as a result of operational and security lighting at the proposed substation. 		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operation	
Criteria	Without Mitigation	With Mitigation
Intensity	Low	Low
Duration	Long-term	Long-term
Extent	Site	Site
Consequence	Low	Low
Probability	Probable	Probable
Significance	Low -	Low -
Degree to which impact can be reversed	Impacts are partly reversible with decommissioning of infrastructure.	
Degree to which impact may cause irreplaceable loss of resources	Marginal loss of visual resources without mitigation measures.	
Degree to which impact can be mitigated	There is limited scope for mitigation as per the recommended mitigation measures below.	
The following measures are recommended:	<ul style="list-style-type: none"> ▪ Where possible, limit the number of maintenance vehicles using access roads. ▪ Where possible, limit the amount of security and operational lighting present at the on-site substation. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Buildings on the substation site should be painted with natural tones that fit with the surrounding environment. ▪ Non-reflective surfaces should be utilised where possible. 	
The following monitoring is recommended:	<ul style="list-style-type: none"> ▪ Ensure that visual management measures are monitored by an ECO. This will include monitoring activities associated with visual impacts such as the control of signage, lighting and maintenance vehicles on access roads.. 	

Nature of cumulative impacts	<ul style="list-style-type: none"> ▪ Additional renewable energy and associated infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. ▪ Visual intrusion of multiple renewable energy and infrastructure developments may be exacerbated, particularly in more natural undisturbed settings. ▪ Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. ▪ The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area. 	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	High -	Medium -

7.1.3 Impacts during Decommissioning Phase

Table 8: Rating of Impacts of Proposed Power Line, MTS, BESS and Access Roads During Decommissioning

Issue:		
<ul style="list-style-type: none"> ▪ Potential alteration of the visual character and sense of place ▪ Potential visual impact on receptors in the study area 		
Description of Impact		
<ul style="list-style-type: none"> ▪ Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. ▪ Decommissioning activities may be perceived as an unwelcome visual intrusion. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during decommissioning would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. ▪ Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact. 		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Decommissioning	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Short-term	Short-term
Extent	Site	Site
Consequence	Low	Very Low
Probability	Probable	Probable
Significance	Low -	Low -
Degree to which impact can be reversed	Impacts are completely reversible with cessation of decommissioning activity.	
Degree to which impact may cause irreplaceable loss of resources	Marginal loss of visual resources without mitigation measures.	
Degree to which impact can be mitigated	There is significant scope for mitigation as per the recommended mitigation measures below.	

<p>The following measures are recommended:</p>	<ul style="list-style-type: none"> ▪ All infrastructure that is not required post-decommissioning should be removed. ▪ Carefully plan to minimize the decommissioning period and avoid delays. ▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly. ▪ Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated as soon as possible. ▪ Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required. 	
<p>The following monitoring is recommended:</p>	<ul style="list-style-type: none"> ▪ Ensure that procedures for the removal of structures and stockpiles during decommissioning are implemented, including recycling of materials. ▪ In addition, it must be ensured that rehabilitation of the site to a visually acceptable standard is undertaken. 	
<p>Nature of cumulative impacts</p>	<ul style="list-style-type: none"> ▪ Combined visual impacts from decommissioning activities associated with multiple renewable energy and grid connection infrastructure projects in the broader area could further alter the sense of place and visual character of the area; and ▪ Combined visual impacts from decommissioning activities associated with the development of multiple renewable energy and grid connection infrastructure projects in the broader area could potentially exacerbate visual impacts on visual receptors. 	
<p>Rating of cumulative impacts</p>	<p style="text-align: center;">Without Mitigation</p>	<p style="text-align: center;">With Mitigation</p>
	<p style="text-align: center;">Medium -</p>	<p style="text-align: center;">Low -</p>

7.2 Alternatives

As mentioned in **Section 4.4**, no site, layout, technology⁵ or power line corridor alternatives are being considered and assessed as part of the BA process. A power line corridor with a width of 300m (150m on either side of centre line) is however being proposed and assessed for each of the 400kV and 132kV power lines which form part of the BA process. This is to allow flexibility when routing the power lines within the authorised corridor. No corridor is being considered for the proposed 33kV power line.

The site proposed for the MTS and respective power line 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 farming activities on the site would prevail. In the event that the proposed power lines, MTS and associated infrastructure are not developed, the area would retain its visual character and sense of place and no visual impacts would be experienced by any locally occurring receptors.

⁵ 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.

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 time⁶ 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 time⁶, 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 Faraday PV solar projects and associated infrastructure - [14/12/16/3/3/2/855](#)
- 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](#)

⁶ 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.

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 power line 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.

The relatively large number of renewable energy facilities and associated grid connection infrastructure, in conjunction the extensive electrical infrastructure already present within the surrounding area and their potential for large-scale visual impacts could significantly alter the sense of place and visual character in the broader region, as well as exacerbate the visual impacts on surrounding visual receptors, once constructed. From a visual perspective, the concentration of renewable energy facilities as proposed will further change the visual character of the area and alter the inherent sense of place, extending an increasingly industrial character into the broader area, and resulting in significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommended mitigation measures. In addition, it is possible that these developments in close proximity to each other could be seen as one large Renewable Energy Facility (REF) rather than several separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

An examination of the literature available for the environmental assessments undertaken for many of these renewable energy applications showed that the visual impacts identified and the recommendations and mitigation measures provided are largely consistent with those identified in this report.

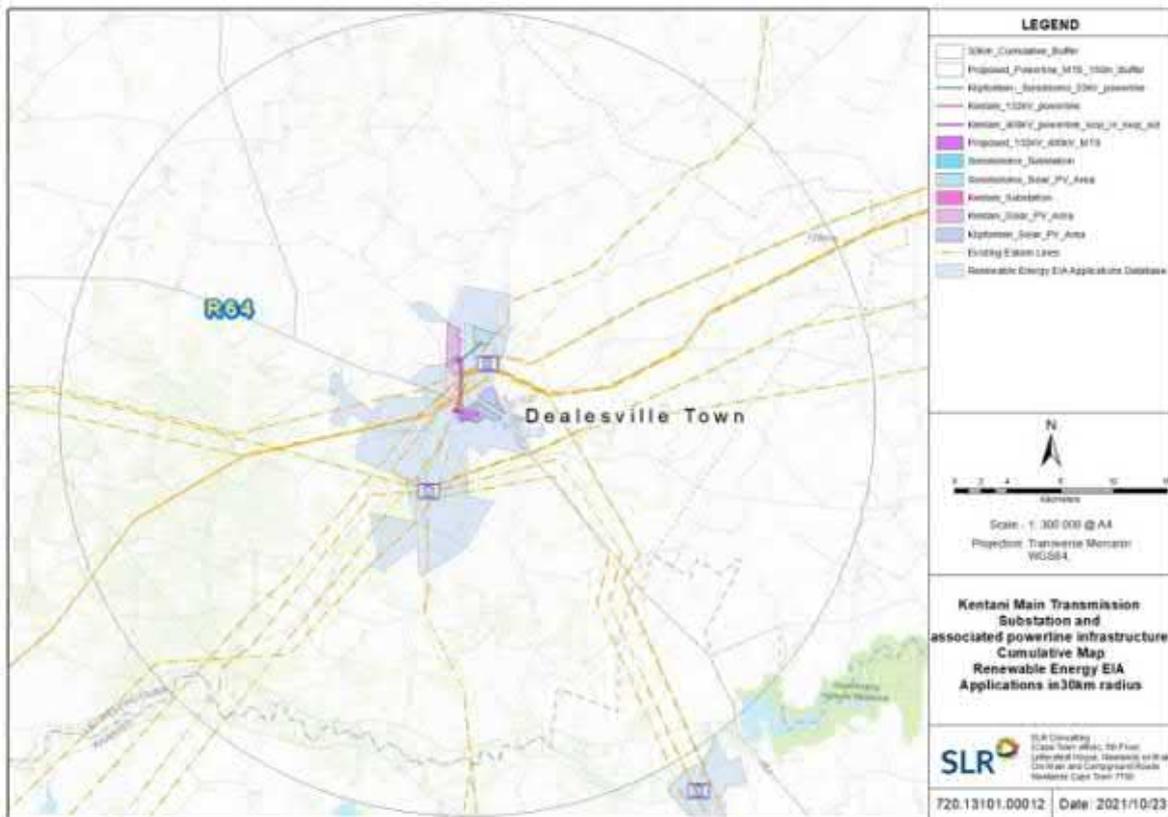


Figure 25: Cumulative Map indicating REFs within the 30km buffer of the proposed MTS and Powerlines (including Powerline Corridors)

8 MITIGATION AND EMPR REQUIREMENTS

Impact	Mitigation / Management Objectives	Mitigation / Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. CONSTRUCTION PHASE					
B.1. VISUAL IMPACTS					
Potential impact on visual resources as a result of the proposed power line and substation.	Avoid or minimize construction impacts on existing visual resources and potentially sensitive receptor locations in the surrounding area.	<ul style="list-style-type: none"> ▪ Carefully plan to minimise the construction period and avoid construction delays. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the construction site, where possible. ▪ Ensure that dust suppression techniques are implemented: <ul style="list-style-type: none"> ○ on all access roads; ○ in all areas where vegetation clearing has taken place; ○ on all soil stockpiles. 	Ensure that visual management measures are monitored by an ECO. This will include monitoring activities associated with visual impacts such as the siting and management of soil stockpiles, screening and dust suppression. Regular reporting to an environmental management team must also take place during the construction phase.	Ongoing during construction	<ul style="list-style-type: none"> ▪ Main Contractor (MC), Environmental Officer (EO) and ECO
B. OPERATION PHASE					

Impact	Mitigation / Management Objectives	Mitigation / Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
C.1. VISUAL IMPACTS					
Potential impact on visual resources as a result of the proposed grid connection infrastructure.	Avoid or minimize operational impacts on existing visual resources and potentially sensitive receptor locations in the surrounding area.	<ul style="list-style-type: none"> ▪ Where possible, limit the number of maintenance vehicles using access roads. ▪ Where possible, limit the amount of security and operational lighting present at the on-site substation.. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Buildings on the SS sites should be painted with natural tones that fit with the surrounding environment. ▪ Non-reflective surfaces should be utilised where possible. 	Ensure that visual mitigation measures are monitored by the management team on an on-going basis. This will include monitoring activities associated with visual impacts such as the control of signage, lighting and maintenance vehicles on access roads.	Ongoing during operation	<ul style="list-style-type: none"> ▪ ESKOM
C. DECOMMISSIONING PHASE					
D.1. VISUAL IMPACTS					
Potential impact on visual resources as a result of the proposed grid connection infrastructure.	Avoid or minimize impacts of decommissioning activities on existing visual resources and potentially sensitive receptor locations in the surrounding area.	<ul style="list-style-type: none"> ▪ All infrastructure that is not required post-decommissioning should be removed. ▪ Carefully plan to reduce the decommissioning period and avoid delays. ▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly. ▪ Position storage / stockpile areas in unobtrusive positions 	Ensure that procedures for the removal of structures and stockpiles during decommissioning are implemented, including recycling of materials. In addition, it must be ensured that rehabilitation of the site to a visually acceptable standard is undertaken.	During decommissioning	<ul style="list-style-type: none"> ▪ MC, EO and ECO

Impact	Mitigation / Management Objectives	Mitigation / Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>in the landscape, where possible.</p> <ul style="list-style-type: none"> ▪ Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated as soon as possible. ▪ Rehabilitated areas must be monitored post-decommissioning and remedial actions implemented as required. 			

9 CONCLUSION AND SUMMARY

9.1 Summary of Findings

A VIA has been conducted to assess the magnitude and significance of the potential visual impacts associated with the construction of the proposed Main Transmission Substation (MTS), BESS and associated 400 kV, 132 kV and 33kV overhead power lines and access roads. The VIA has demonstrated that the study area has a somewhat mixed visual character, transitioning from the heavily transformed landscape associated with Perseus Substation and the town of Dealesville in the east to a more rural / pastoral character across the remainder of the study area.. Hence, although the proposed development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed development in relatively close proximity to Perseus Substation and its extensive network of high voltage power lines, will reduce the level of contrast.

A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a **low** visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. The area is not however typically valued for its tourism significance and no leisure-based tourism facilities or formal protected areas were identified within 5 kms of the proposed development. This factor in conjunction with the high levels of transformation in the east have reduced the overall visual sensitivity of the area.

A total of eighteen (18) potentially sensitive receptors were identified in the study area, none of which was found to be sensitive. All of the identified receptors are believed to be farmsteads that are regarded as *potentially* sensitive visual receptors as the proposed development will likely alter natural or semi-natural vistas experienced from these locations. Three of the receptor locations are outside the viewshed for the proposed power lines and substation site and none of the remaining receptors are expected to experience high levels of visual impact as a result of the proposed development. Ten of the remaining receptor locations are expected to experience moderate levels of impact as a result of the power line and substation development, while five receptors will only experience low levels of visual impact.

Although the R64 receptor road traverses the study area, motorists travelling along this route are only expected to experience low levels of impact from the proposed development due to the degree of landscape degradation already present.

An assessment of overall impacts revealed that visual impacts associated with the proposed power lines, BESS and MTS are of low significance during construction, operation and decommissioning phases, with a number of mitigation measures available.

Considering the presence of extensive electrical infrastructure and multiple planned renewable energy projects, the introduction of additional electrical infrastructure in the area will result in further change in the visual character of the area and alteration of the inherent sense of place, extending an increasingly industrial character into the broader area, and resulting in significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommended mitigation measures. In light of this, cumulative impacts (with mitigation) have been rated as low during construction and decommissioning and medium during operation.

From a visual perspective, no fatal flaws were identified in respect of the proposed development.

9.2 Conclusion and Impact Statement

It is SiVEST's opinion that the potential visual impacts associated with the proposed Main Transmission Substation (MTS), Battery Energy Storage System and associated 400 kV, 132 kV and 33kV overhead power lines and access roads are negative and of moderate significance. Given the relatively low number of potentially sensitive receptors and the significant level of human transformation and landscape degradation in areas near the proposed development, the project is deemed acceptable from a visual perspective and the EA should be granted. SiVEST is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

10 REFERENCES

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- CSIR, 2015. VIA for the Eleven Solar PV Facilities and Supporting Electrical Infrastructure near Dealesville in the Free State.
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- Oberholzer, B. 2005. Guideline for involving visual & aesthetic specialists in EIA processes: *Edition 1*. CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
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Appendix A

SPECIALIST CV AND DECLARATION



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

1. SPECIALIST INFORMATION

Specialist Company Name:	SiVEST SA (Pty) Ltd		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	2	Percentage Procurement recognition
Specialist name:	Kerry Schwartz		
Specialist Qualifications:	BA		
Professional affiliation/registration:	SAGC (GISc Technician)		
Physical address:	12 Autumn St, Rivonia		
Postal address:	PO Box 2921, Rivonia		
Postal code:	2128	Cell:	082 469 5850
Telephone:	011 798 0632	Fax:	011 8037272
E-mail:	kerrys@sivest.co.za		

2. DECLARATION BY THE SPECIALIST

I, **Kerry Schwartz**, 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.

K Schwartz

Signature of the Specialist

SiVEST SA (PTY) Ltd

Name of Company:

08 November 202

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, **Kerry Schwartz**, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

K Schwartz
Signature of the Specialist

SIVEST SA (Pty) Ltd
Name of Company

08 November 2021
Date

[Signature]
Signature of the Commissioner of Oaths

Hlengiwe Innocentia Ntuli
COMMISSIONER OF OATHS

Signature: [Signature]

PPP Administrator
RO-02/11/2020 ZA-GT-10/11/2020

08 November 2021
Date

Date 08/11/2021 Place Pietermaritzburg
Business Address: 12 Autumn Street, Rivonia 2128

Name	Kerry Lianne Schwartz
Profession	GIS Specialist
Name of Firm	SiVEST SA (Pty) Ltd
Present Appointment	Senior GIS Consultant: Environmental Division
Years with Firm	32 Years
Date of Birth	21 October 1960
ID No.	6010210231083
Nationality	South African



Professional Qualifications

BA (Geography), University of Leeds 1982

Membership to Professional Societies

South African Geomatics Council – GTc GISc 1187

Employment Record

1994 – Present	SiVEST SA (Pty) Ltd - Environmental Division: GIS/Database Specialist.
1988 - 1994	SiVEST (formerly Scott Wilson Kirkpatrick): Town Planning Technician.
1984 – 1988	Development and Services Board, Pietermaritzburg: Town Planning Technician.

Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
English	Fluent	Fluent	Fluent

Key Experience

Kerry is a GIS specialist with more than 25 years' experience in the application of GIS technology in various environmental, regional planning and infrastructural projects undertaken by SiVEST.

Kerry's GIS skills have been extensively utilised in projects throughout South Africa in other Southern African Countries. These projects have involved a range of GIS work, including:

- Design, compilation and management of a spatial databases in support of projects.
- Collection, collation and integration of data from a variety of sources for use on specific projects.
- Manipulation and interpretation of both spatial and alphanumeric data to provide meaningful inputs for a variety of projects.
- Production of thematic maps and graphics.
- Spatial analysis and 3D modelling.

Kerry further specialises in visual impact assessments (VIAs) and landscape assessments for various projects, including renewable energy facilities, power lines and mixed use developments.

Projects Experience

STRATEGIC PLANNING PROJECTS

Provision of database, analysis and GIS mapping support for the following:

- Database development for socio-economic and health indicators arising from Social Impact Assessments conducted for the Lesotho Highlands Development Association – Lesotho.
- Development Plans for the adjacent towns of Kasane and Kazungula and for the rural village of Hukuntsi in Botswana.
- Integrated Development Plans for various District and Local Municipalities in KwaZulu-Natal Province.
- Rural Development Initiative and Rural Roads Identification for uMhlathuze Local Municipality (KwaZulu-Natal).
- Tourism Initiatives and Master Plans for areas such as the Mapungubwe Cultural Landscape (Limpopo Province) and the Northern Cape Province.
- Spatial Development Frameworks for various Local and District Municipalities in KwaZulu-Natal and Mpumalanga and Free State Provinces.
- Land Use Management Plans/Systems (LUMS) for various Local Municipalities in KwaZulu-Natal.
- Land use study for the Johannesburg Inner City Summit and Charter.
- Port of Richards Bay Due Diligence Investigation.

BUILT INFRASTRUCTURE

- EIA and EMP for a 9km railway line and water pipeline for manganese mine – Kalagadi Manganese (Northern Cape Province).
- EIA and EMP for 5x 440kV Transmission Lines between Thyspunt (proposed nuclear power station site) and several substations in the Port Elizabeth area – Eskom (Eastern Cape Province).
- Initial Scoping for the proposed 750km multi petroleum products pipeline from Durban to Gauteng/Mpumalanga – Transnet Pipelines.
- Detailed EIA for multi petroleum products pipeline from Kendall Waltloo, and from Jameson Park to Langlaagte Tanks farms –Transnet Pipelines.
- Environmental Management Plan for copper and cobalt mine (Democratic Republic of Congo).
- EIA and Agricultural Feasibility study for Miwani Sugar Mill (Kenya).
- EIAs for Concentrated Solar and Photovoltaic power plants and associated infrastructure (Northern Cape, Free State, Limpopo and North West Province).
- EIAs for Wind Farms and associated infrastructure (Northern Cape and Western Cape).
- Basic Assessments for 132kV Distribution Lines (Free State, KwaZulu-Natal, Mpumalanga and North West Province).
- Environmental Assessment for the proposed Moloto Development Corridor (Limpopo).
- Environmental Advisory Services for the Gauteng Rapid Rail Extensions Feasibility Project.
- Environmental Screening for the Strategic Logistics and Industrial Corridor Plan for Strategic Infrastructure Project 2, Durban-Free State-Gauteng Development Region.

STATE OF THE ENVIRONMENT REPORTING

- 2008 State of the Environment Report for City of Johannesburg.
- Biodiversity Assessment – City of Johannesburg.

STRATEGIC ENVIRONMENTAL ASSESSMENTS AND ENVIRONMENTAL MANAGEMENT FRAMEWORKS

- SEA for Greater Clarens – Maloti-Drakensberg Transfrontier Park (Free State).
- SEA for the Marula Region of the Kruger National Park, SANParks.
- SEA for Thanda Private Game Reserve (KwaZulu-Natal).
- SEA for KwaDukuza Local Municipality (KwaZulu-Natal).
- EMF for proposed Renishaw Estate (KwaZulu-Natal).
- EMF for Mogale City Local Municipality, Mogale City Local Municipality (Gauteng).
- SEA for Molemole Local Municipality, Capricorn District Municipality (Limpopo).
- SEA for Blouberg Local Municipality, Capricorn District Municipality (Limpopo).
- SEA for the Bishopstowe study area in the Msunduzi Local Municipality (KwaZulu-Natal).

VISUAL IMPACT ASSESSMENTS

- VIAs for various Solar Power Plants and associated grid connection infrastructure (Northern Cape, Free State, Limpopo and North West Province) the most recent project being:
 - Mooi Plaats, Wonderheuvel and Paarde Valley Solar PV facilities near Nouport (Northern Cape).
 - Oya Energy Facility, near Touws River (Western Cape).
- VIAs for various Wind Farms and associated grid connection infrastructure (Northern Cape and Western Cape), the most recent projects including:
 - Paulputs WEF near Pofadder (Northern Cape)
 - Kudusberg WEF near Matjiesfontein (Western Cape);
 - Tooverberg WEF, near Touws River (Western Cape);
 - Rondekop WEF, near Sutherland (Northern Cape).
 - Gromis and Komas WEFs, near Kleinsee (Northern Cape).
- VIAs for various 132kV Distribution Lines (Free State, KwaZulu-Natal, Mpumalanga and North West Province).
- VIA for the proposed Rorqual Estate Development near Park Rynie on the South-Coast of KwaZulu-Natal Province.
- VIAs for the proposed Assagay Valley and Kassier Road North Mixed Use Development (KwaZulu-Natal).
- VIA for the proposed Tinley Manor South Banks Development (KwaZulu-Natal).
- VIA for the proposed Tinley Manor South Banks Beach Enhancement Solution, (KwaZulu-Natal).
- VIAs for the proposed Mlonzi Hotel and Golf Estate Development (Eastern Cape Province).

Appendix A

TERMS OF REFERENCE

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

TERMS OF REFERENCE (ToR) FOR SPECIALIST STUDIES

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1 INTRODUCTION¹

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing the development of (1) Main Transmission Substation (MTS) and three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines), Li-Ion Battery Energy Storage System, the associated electrical infrastructure, (the 'proposed development') that will connect to the authorised Solar Energy Facilities i.e. Kentani, Klipfontein, Klipfontein 2, Leliehoek, Sonoblomo, Braklaagte, Boschrand 2, Meeding, Irene and Braambosch, collectively known as the Kentani Cluster located near the town of Dealesville, Tokologo Local Municipality (Lejweleputswa District) in the Free State Province. The proposed development will also involve the re-routing of eight (8) 132kV powerlines within the grid connection corridor which has been authorised as part of the Kentani Cluster, making provision for this routing in the new proposed MTS (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

¹ Important definitions:

- 1) **Project Site** = Total extent of the land parcel(s)
- 2) **Development Area** = Identified area (located within the project site) where the MTS and powerlines are planned to be located. This area has been selected as a practical option for the project, considering technical preference and constraints
- 3) **Development Envelope** = Area identified considering and avoiding identified environmental constraints present within the development area
- 4) **Development Footprint** = Any evidence of physical alteration as a result of the undertaking of any activity

(DFFE)]. 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), which is proposed on the Remaining Extent of the Farm Klipfontein No. 305 (SG Code: F0040000000030500000). Of the eleven (11) powerlines, eight (8) are 132kV powerlines which are located within the authorised corridor, and which have been included as part of the authorised solar PV developments. 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).

Considering the above, it is important to note that the location of the proposed MTS as well as the corridors being proposed for the powerlines 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 ².

Moreover, the proposed MTS and powerlines are located within the Kimberly Renewable Energy Development Zone and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notices No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively. 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) will 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. 800m in length) are being proposed and will connect the proposed MTS to the existing Eskom 400kV powerline, located approximately 1km west of the proposed MTS site, via a Loop-In-Loop Out (LILO) connection; and
2. One (1) 132kV powerline (approx. 4km in length) is being proposed and 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.
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 not trigger the need for an Application for Environmental Authorisation, however, the powerline has been considered by the specialist team.

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.

As part of the BA process, powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the 400kV and 132kV powerlines. This is to allow flexibility when routing the

² 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).

powerlines within the authorised corridor (should the EA be granted). No corridor is however being considered for the proposed 33kV powerline.

In terms of the EIA Regulations, 2014 (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 Department of Forestry, Fisheries and the Environment (DFFE), prior to the commencement thereof. One (1) application for EA for the proposed development will be submitted to the DFFE, in the form of a BA process, in terms of the EIA Regulations, 2014 (as amended). To inform the assessment, specialist studies are required.

The purpose of this Terms of Reference (ToR) is to provide the specialist team with a consistent approach to the respective specialist studies. The specialist deliverables are twofold and include the following:

- (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).

The specialist reports which are required as part of this BA process are detailed in Section 2.1.

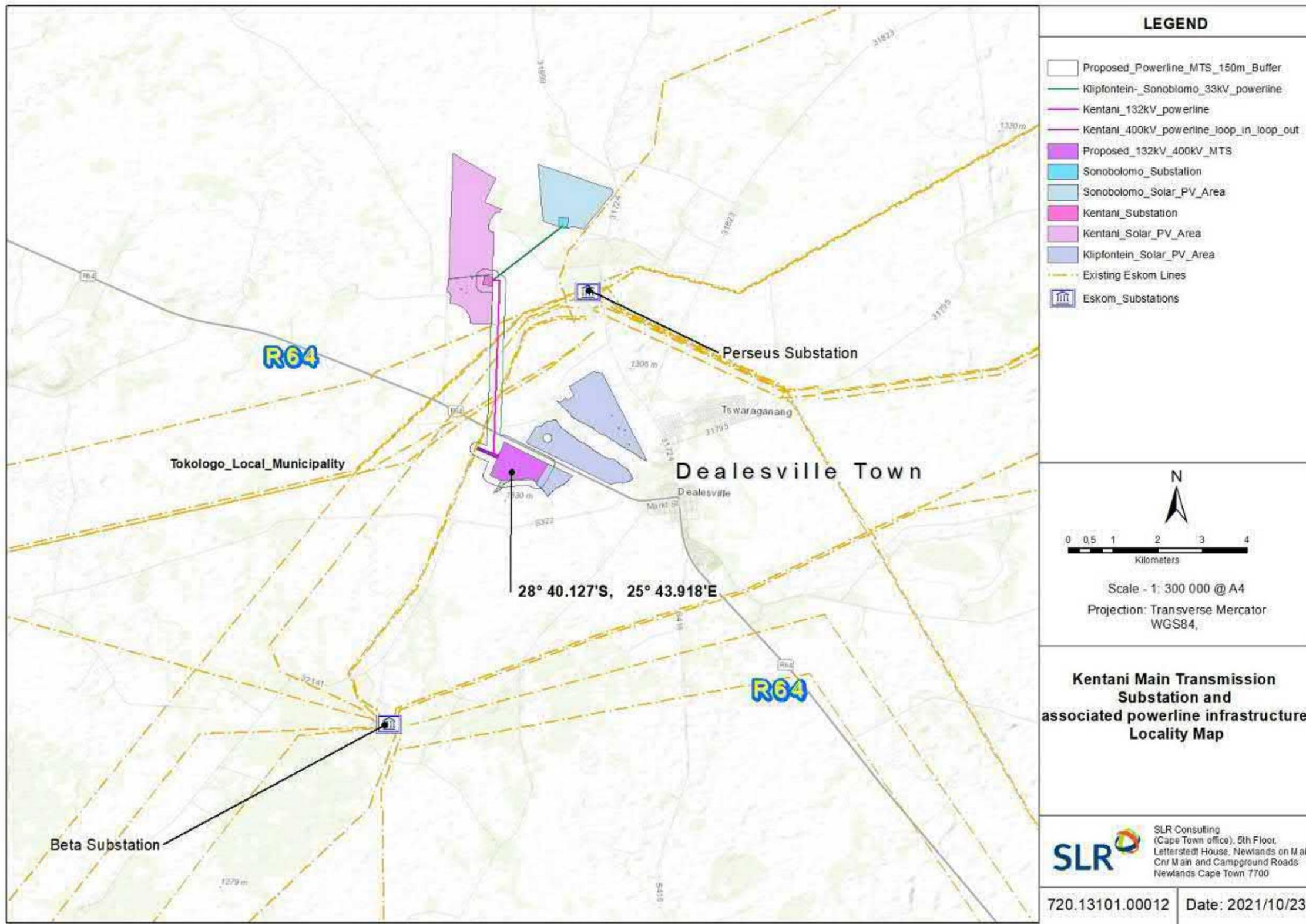


Figure 1: Locality Map of the proposed Main Transmission Substation (MTS) and associated electrical infrastructure (including grid connection corridors)

2 SPECIALIST REPORTING REQUIREMENTS

2.1 Compilation of Specialist Reports

The specialists are requested to compile the following reports, in line with Appendix 6 of the EIA Regulations, 2014 (as amended), as well as any specific Gazetted specialist protocols³ (if required / applicable):

1. Site Sensitivity Verification Report (SSVR); and
2. Specialist Impact Assessment Report (including management measures and recommendations)

Table 2-1: Reports required and applicable NEMA process

Specialist Report	Project	Process
Site Sensitivity Verification Report (SSVR)	132kV/400kV On-site Main Transmission Substation (MTS) and associated infrastructure near Dealesville in the Free State Province	BA Process
Specialist Impact Assessment Report		

2.2 Site Sensitivity Verification Report (SSVR) and Specialist Assessment Report Templates

The main deliverables have associated templates to ensure all components of the reports are included in your submission, as follows:

1. Site Sensitivity Verification Report (SSVR) – (Separate document on OneDrive which will be made available to specialists)
2. Specialist Assessment Report – (Separate document on OneDrive which will be made available to specialists)
3. Compliance Statement (if applicable) – see Section 2.2.3 below

It is not mandatory to use the specific specialist report template(s), as long as the same content is included in your own template.

2.2.1 SSVR Template

Note: It is mandatory that all specialists submit a SSVR, according to GN 320 of March 2020 (Separate document on OneDrive which will be made available to specialists)

2.2.2 Specialist Assessment Report Template

The template includes generic project information for all reports and if used, the content for the other respective reports should be deleted as applicable. Alternatively, generic project information can be copied and pasted into your own template, as required by GN.320 and GN 1150 (2020). (Separate document on OneDrive which will be made available to specialists)

In summary, the key content is as follows:

1. If relevant, a table cross referencing how the requirements for specialist reports have been adhered to according to Appendix 6 of the EIA Regs, 2014 (as amended)
2. Executive summary
3. Project description
4. Relevant legislation and guidelines, including the requirement for any permits

³ GN 320 (20 March 2020): 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.

5. Methodology, including details of field work; consultations; gaps and uncertainties
6. Baseline environment
7. Sensitivity mapping [overlay with the layout(s)]
8. Impact assessment, including the 'no-go' assessment
9. Mitigation and Environmental Management Programme (EMPr) requirements
10. Cumulative impact assessment
11. Conclusion / impact statement on the acceptability of the project

2.2.3 Compliance Statement

As specified in the respective protocols, in summary the compliance statement must:

1. be applicable to the preferred site and proposed development footprint (project description can be found in Separate document on OneDrive which will be made available to specialists);
2. confirm the sensitivity of the site for your discipline; and
3. indicate whether or not the proposed development will have any impact / an unacceptable impact on the resource.

The compliance statement must contain, as a minimum, the following information:

1. the contact details of the specialist, their South African Council for Natural Scientific Professions (SACNASP) registration number, their field of expertise and a curriculum vitae (CV);
2. a signed statement of independence by the specialist (template can be found in separate document on OneDrive which will be made available to specialists);
3. Baseline profile or sensitivity mapping, as required by the applicable protocol;
4. Methodology, including details of site inspection, any modelling or calculations required by the protocol or any associated design recommendations that have applied to reduce impacts;
5. a substantiated statement from the specialist on the acceptability (or not) of the proposed development and a recommendation on the approval (or not) of the proposed development;
6. any conditions to which this statement is subjected;
7. in the case of a linear activity, confirmation from the specialist that, in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two (2) years of completion of the construction phase;
8. where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr; and
9. a description of the assumptions made and any uncertainties or gaps in knowledge or data.

2.3 Project description

The project description for the proposed development is set out in the Assessment Report template (Separate document on OneDrive which will be made available to specialists) which has been compiled, to ensure that all available technical information is available for assessment and for the compilation of the specialist report. This same project description can then be used for the SSV Report and Impact Assessment / Compliance Report (as required), although not repeated in these templates.

Please take note of the following important definitions:

- 1) **Project Site** = Total extent of the land parcel(s)
- 2) **Development Area** = Identified area (located within the project site) where the MTS and powerlines are planned to be located. This area has been selected as a practical option for the project, considering technical preference and constraints
- 3) **Development Envelope** = Area identified considering and avoiding identified environmental constraints present within the development area

- 4) **Development Footprint** = Any evidence of physical alteration as a result of the undertaking of any activity

2.4 Impact Rating Methodology

The impacts of the proposed development (during the Pre-Construction, Construction, Operation and Decommissioning phases) are to be assessed and rated according to the methodology described below, which was developed by SLR to align with the requirements of the EIA Regulations, 2014 (as amended).

Specialists will be required to make use of the impact rating matrix provided (in Excel format) for this purpose.

The criteria used to assess both the impacts and the method of determining the significance of the impacts is outlined in Table 2. This method complies with the method provided in the EIA guideline document (GN 654 of 2010). **Part A** provides the definitions of the criteria and the approach for determining impact consequence (combining intensity, extent and duration). In **Part B**, a matrix is applied to determine this impact consequence. In **Part C**, the consequence rating is considered together with the probability of occurrence in order to determine the overall significance of each impact. Lastly, the interpretation of the impact significance is provided in **Part D**.

Table 2: 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	Site	Impact is limited to the immediate footprint of the activity and immediate surrounds within a confined area.

EXTENT of impacts	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.				

The specialists are also required to include a comment, as follows, on the degree to which the impact:

1. Can be reversed;
2. May cause irreplaceable loss of resources; and
3. Can be avoided, managed or mitigated.

3 CUMULATIVE ASSESSMENT

A cumulative impact can be defined as *“the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that itself may not be significant,*

but may be significant when added to the existing and foreseeable impacts culminating from similar or diverse activities” (NEMA EIA Reg GN R982 of 2014).

The South African Renewable Energy EIA Application Database (REEA) available at the time (namely “REEA_OR_2021_Q2”) shows 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 time⁴, 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 Faraday PV solar projects and associated infrastructure - [14/12/16/3/3/2/855](#)
- 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](#)

There are therefore a number of renewable energy applications for EA either approved or being proposed within a 30km radius of the proposed project site. 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.

There are however no operational renewable energy developments situated within a 30km radius of the proposed project site to the knowledge of the EAP. Should more information regarding renewable energy applications for EA within a 30km radius of the proposed project site becomes available, this will be disseminated to the specialists (should SLR be able to obtain information regarding these applications).

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.

The cumulative impact assessed will therefore be the collective impact of the proposed MTS and powerline application along with the other renewable energy development applications (either approved or being proposed) mentioned above which are located within a 30km radius of the project site.

A map showing the other renewable energy development applications located within a 30km radius of the proposed project site will be provided to the specialists once it becomes available.

3.1 Assessment of Alternatives

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, as mentioned, the proposed MTS will be located within the authorised Klipfontein PV facility ([14/12/16/3/3/2/722](#)), and as such the location of the proposed MTS has previously been assessed as part of the development footprint for the Klipfontein PV project. Eight (8) 132kV powerlines are also located within the authorised corridor included as part of the authorised Kentani Cluster and thus the location of the corridors being proposed have also previously been assessed as part of the development footprint for the Kentani Cluster of solar PV developments.

The site proposed for the MTS and respective grid connection corridors will however each be assessed against the 'no-go' alternative. The 'no-go' alternative is the option of not constructing the Project and where the *status quo* of the current status and/or activities on the site would prevail.

4 SPECIALIST SPECIFIC DELIVERABLES

Each specialist may have a different set of deliverables for the MTS and Powerline reports, based on the EIA Regulations (and associated Specialist Theme Protocols) and the nature of the sensitivity / activities. These are twofold and may include the following:

1. **Site Sensitivity Verification Report**, in terms of GN 320 of 20 March 2020 and/or GN 1150 of 30 October 2020;
2. **Impact Assessment Report:**
 - a. **Specialist Assessment Report / Compliance Statement** (as applicable), in terms of GN 320 of 20 March 2020 and/or GN 1150 of 30 October 2020 (where applicable, the Species Environmental Assessment Guideline may apply⁵); or
 - b. Compliance with **Appendix 6 of the EIA Regulations, 2014 (as amended)**, should no protocols apply to the discipline.

Refer to the Section 4.1 below for specifics for each specialist. A template for the SSV Report and Impact Assessment Report is provided (Separate documents on OneDrive).

⁵ Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 2.1 2021.

4.1 Specialist Deliverables

Report	Site Sensitivity Verification Report	Level of impact assessment and relevant legislation		
	SSV Report in terms of GN 320 of 20 March 2020	Compliance Statement in terms of GN 320 / GN 1150 of 20 March 2020	Specialist Assessment Report in terms of GN 320 March 2020 / GN 1150 of Oct 2020	Appendix 6 of NEMA 2014
Terrestrial				
MTS	x		x	
POWERLINES (400kV & 132kV)	x		x	
Plant theme				
MTS	x	x		
POWERLINES (400kV & 132kV)	x	x		
Aquatic				
MTS	x	x		
POWERLINES (400kV & 132kV)	x	x		
Animal theme				
MTS	x		x	
POWERLINES (400kV & 132kV)	x		x	
Birds				
MTS	x			x
POWERLINES (400kV & 132kV)	x		x	
Agriculture				
MTS	x		x	
POWERLINES (400kV & 132kV)	x	x		
Heritage (incl. Palaeo)				
MTS	x			x
POWERLINES (400kV & 132kV)	x			x
Palaeo				
MTS	x			x
POWERLINES (400kV & 132kV)	x			x

Report	Site Sensitivity Verification Report	Level of impact assessment and relevant legislation		
	SSV Report in terms of GN 320 of 20 March 2020	Compliance Statement in terms of GN 320 / GN 1150 of 20 March 2020	Specialist Assessment Report in terms of GN 320 March 2020 / GN 1150 of Oct 2020	Appendix 6 of NEMA 2014
Visual				
MTS	x			x
POWERLINES (400kV & 132kV)	x			x

5 DELIVERABLES AND SUBMISSION REQUIREMENTS

5.1 Deliverables

Please ensure that your submission includes the following:

1. The Site Verification Report and Compliance Statement / Specialist Report (as required) must be in line with the DFFF Screening Tool⁶ Specialist Theme Protocols (as gazetted on 20 March 2020 and 30 October 2020) and where relevant, the Species Environmental Assessment Guideline⁵ (should they apply). Should they not apply, the report must be written in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended);
2. Data for the refined sensitivity layers;
3. Excel spreadsheet of impact ratings; and
4. A copy of the specialist's CV.

5.2 Deadlines

1. Draft Site Verification Report and Compliance Statement / Specialist Report (as required) no later than **22 October 2021**.
2. All spatial information for the reports (where required) to be submitted no later than **22 October 2021**.
3. Mainstream and SLR intends for all reports to be finalised **by 31 October 2021**.

5.3 Report / data formats

1. All specialist reports must be provided in MS Word format;
2. Where maps have been inserted into the report, SLR will require a separate map set in PDF format for inclusion in our submission;
3. Where figures and/or photos have been inserted into the report, SLR will require the original graphic in .jpg format for inclusion in our submission; and
4. 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.**

⁶ <https://screening.environment.gov.za/screeningtool/#/pages/welcome>

Appendix C

Site Sensitivity Verification (in terms of Part A of the Assessment Protocols published in GN 320 on 20 March 2020)

CONTENTS

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1. INTRODUCTION

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing to add 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 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), which is proposed on the Remaining Extent of the Farm Klipfontein No. 305 (SG Code: F0040000000030500000). Of the eleven (11) powerlines, eight (8) are 132kV powerlines which are located within the authorised corridor, and which have been included as part of the authorised solar PV developments. 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).

Considering the above, it is important to note that the location of the proposed MTS as well as the corridors being proposed for the powerlines 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.

Moreover, the proposed MTS and powerlines are located within the Kimberly Renewable Energy Development Zone and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notices No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively. 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.

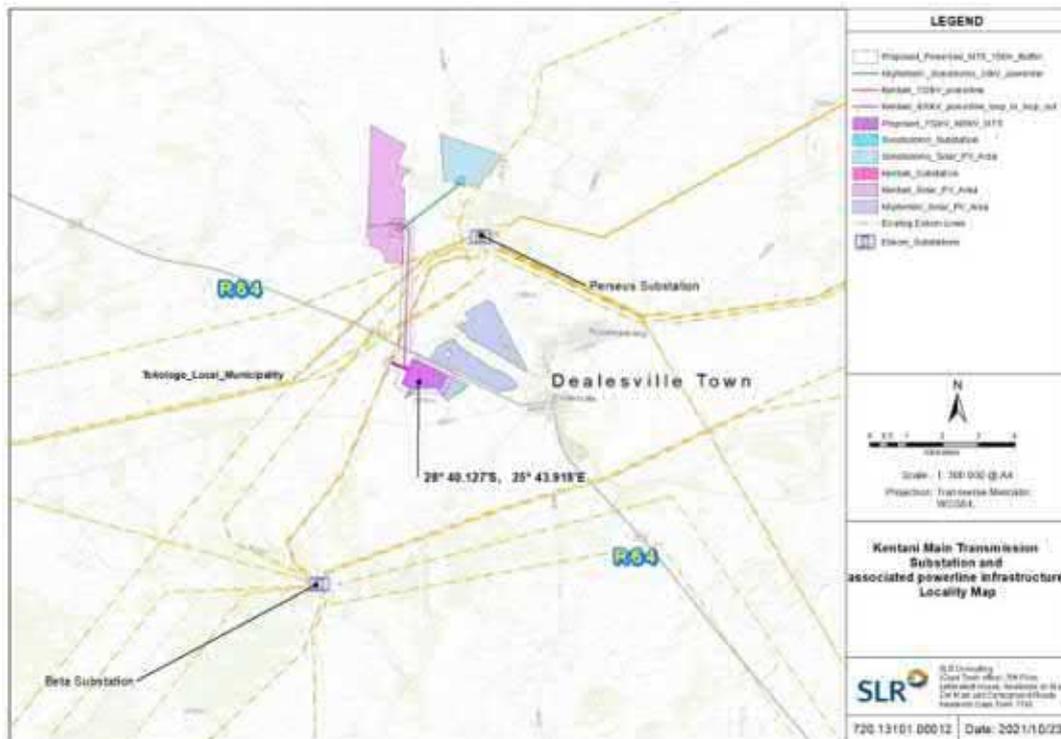


Figure 1: Locality Map of the proposed Main Transmission Substation (MTS) and associated electrical infrastructure (including grid connection corridors)

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).

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) will 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 not 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.

2. SITE SENSITIVITY VERIFICATION METHODOLOGY

A site sensitivity verification has been conducted in support of the Visual Impact Assessment (VIA) for the proposed Main Transmission Substation (MTS), power lines and access roads. The verification exercise is based on a desktop-level assessment supported by field-based observation and involved an assessment of factors as outlined below.

▪ Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was initially sourced from spatial databases provided by National Geospatial Information (NGI), the South African National Biodiversity Institute (SANBI) and the South African National Land Cover Dataset (DFFE / Geoterrimage – 2020). The characteristics identified via desktop means were later verified during the site visit.

▪ Identification of sensitive receptors

Visual receptor locations that are sensitive and / or potentially sensitive to the visual intrusion of the proposed development were identified by way of a desktop assessment as well as field-based investigation. Initially Google Earth imagery (2021) was used to identify potential receptors within the study area and where possible, these receptor locations were verified and assessed during the field investigation.

▪ Fieldwork and photographic review

A two (2) day site visit was undertaken on the 12th and 13th of October 2021 (early spring). The aim of the site visit was to:

- verify the landscape characteristics identified via desktop means;
- conduct a photographic survey of the proposed study area;
- verify the sensitivity of visual receptor locations identified via desktop means;
- eliminate receptor locations that are unlikely to be influenced by the proposed development;
- identify any additional visually sensitive receptor locations within the study area; and
- assist with the assessment and rating of receptor impacts.

3. OUTCOME OF SITE SENSITIVITY VERIFICATION

Visual sensitivity of the broader area surrounding the proposed development was found to be **low** largely due to the relatively low number of potentially sensitive receptors in the area and the level of human transformation and landscape degradation in the area.

A screening exercise was undertaken with the aim of indicating any areas that should be precluded from the proposed development footprint. From a visual perspective, these are areas where the establishment of power lines and/or substation infrastructure would result in the greatest probability of visual impacts on sensitive or potentially sensitive visual receptors.

Using GIS-based visibility analysis, it was possible to determine which sectors of the assessment corridors would be visible to the highest numbers of receptors in the study area. However, this analysis found that no areas are significantly more visible than any other area. As such, in terms of visibility, no areas were found to be particularly sensitive.

In determining visual sensitivity, consideration must also be given to the direct visual impact of the proposed development on any nearby farmsteads or receptors. However, investigation determined that there are no farmsteads or potentially sensitive receptors within 500 m of either of any elements of the power line or MTS development. As such, **no** areas of visual sensitivity were identified in relation to any of the power line alignments or the substation site.

In assessing visual sensitivity, the proposed development was examined in relation to the Landscape Theme of the National Environmental Screening Tool to determine the relative landscape sensitivity for this type of development. The tool does not however identify any landscape sensitivities in respect of power line or substation development.

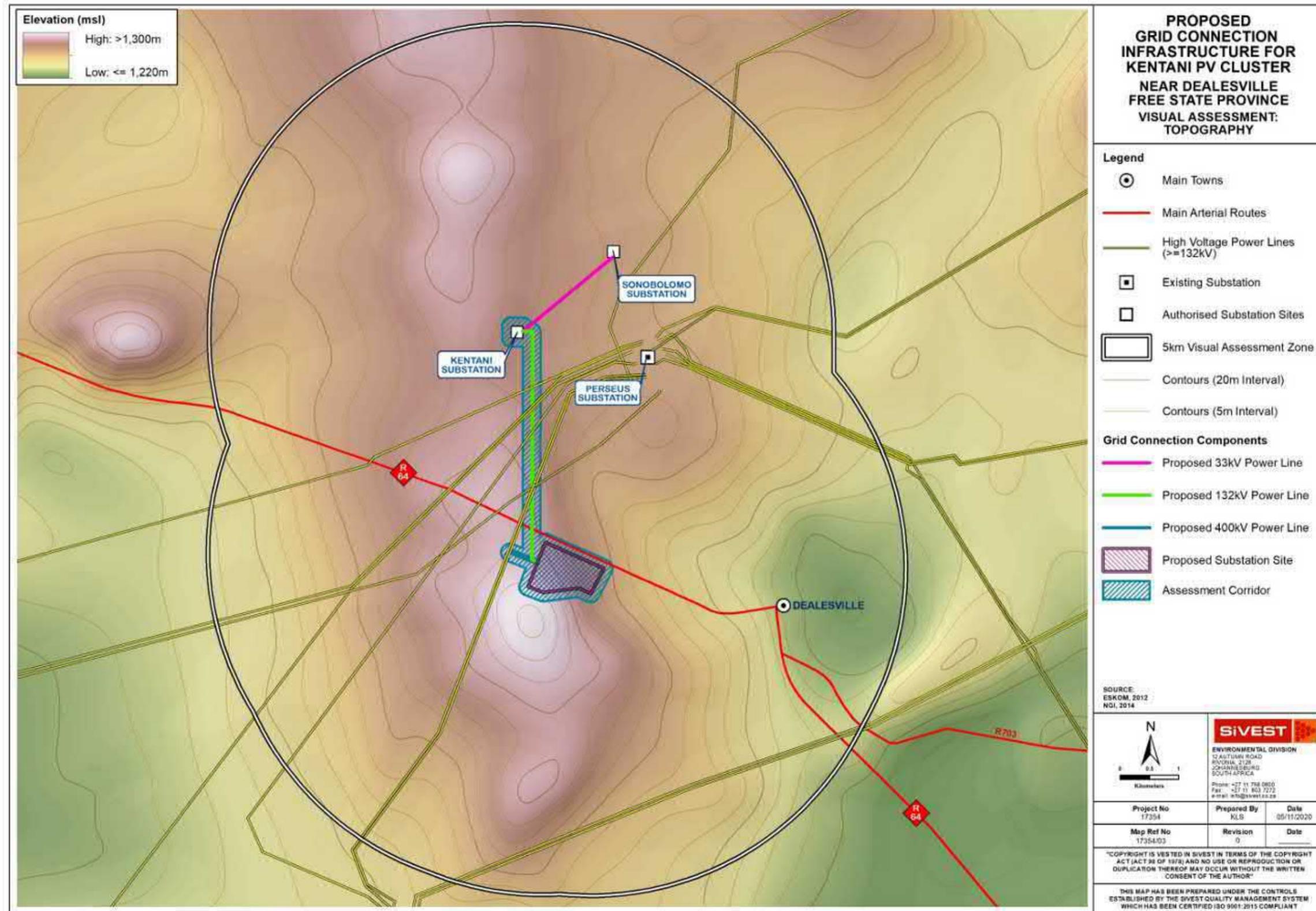
4. CONCLUSION

A site sensitivity verification for the Visual Impact Assessment (VIA) for the proposed Main Transmission Substation (MTS), BESS, power lines and access roads has been conducted, based on a desktop-level assessment supported by field-based observation. As outlined above, it was verified that there are no areas of visual sensitivity in relation to any of the power line alignments or substation site. Furthermore, no landscape sensitivities were identified in terms of the Landscape Theme of the National Environmental Screening Tool.

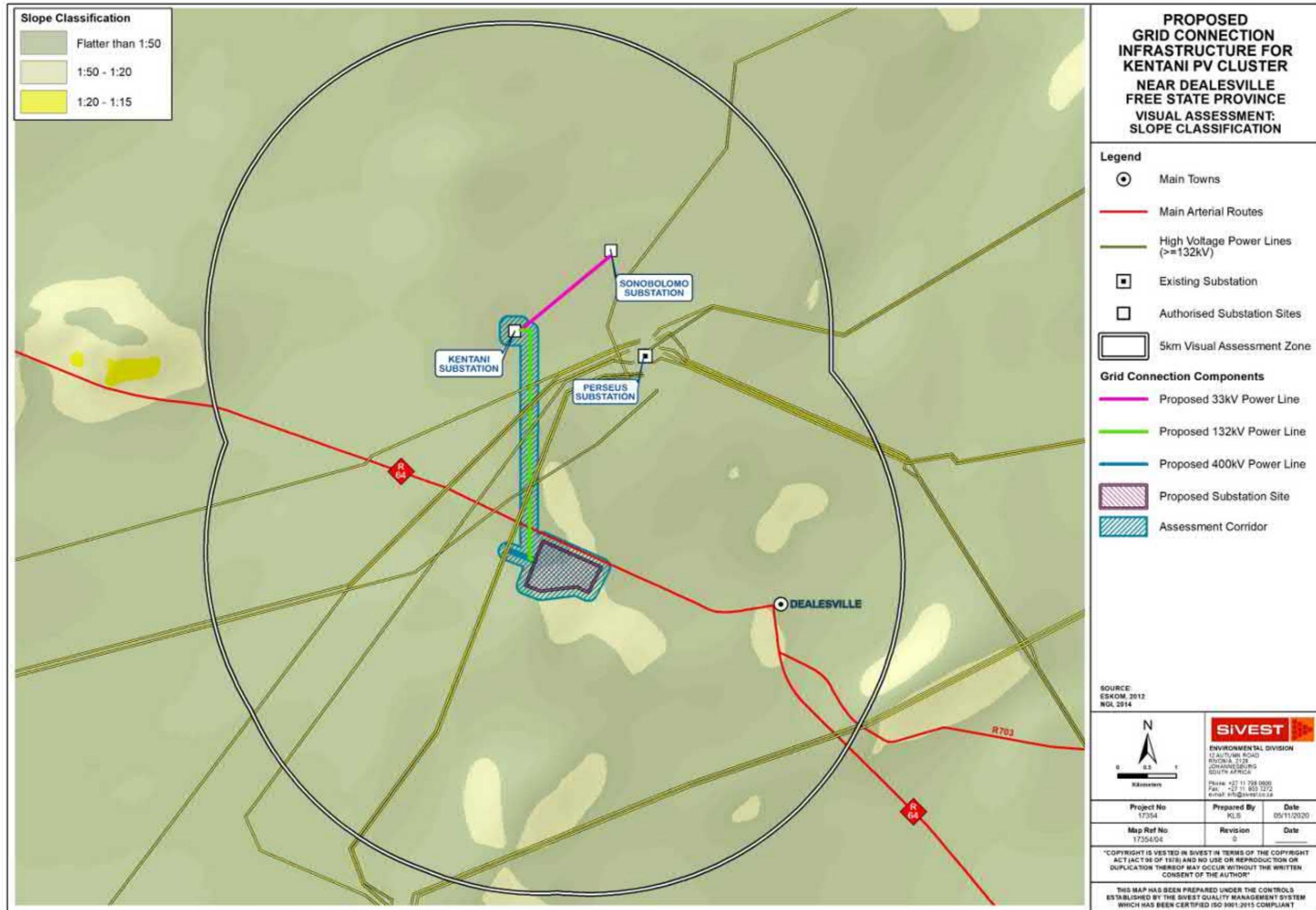
Appendix D

Maps

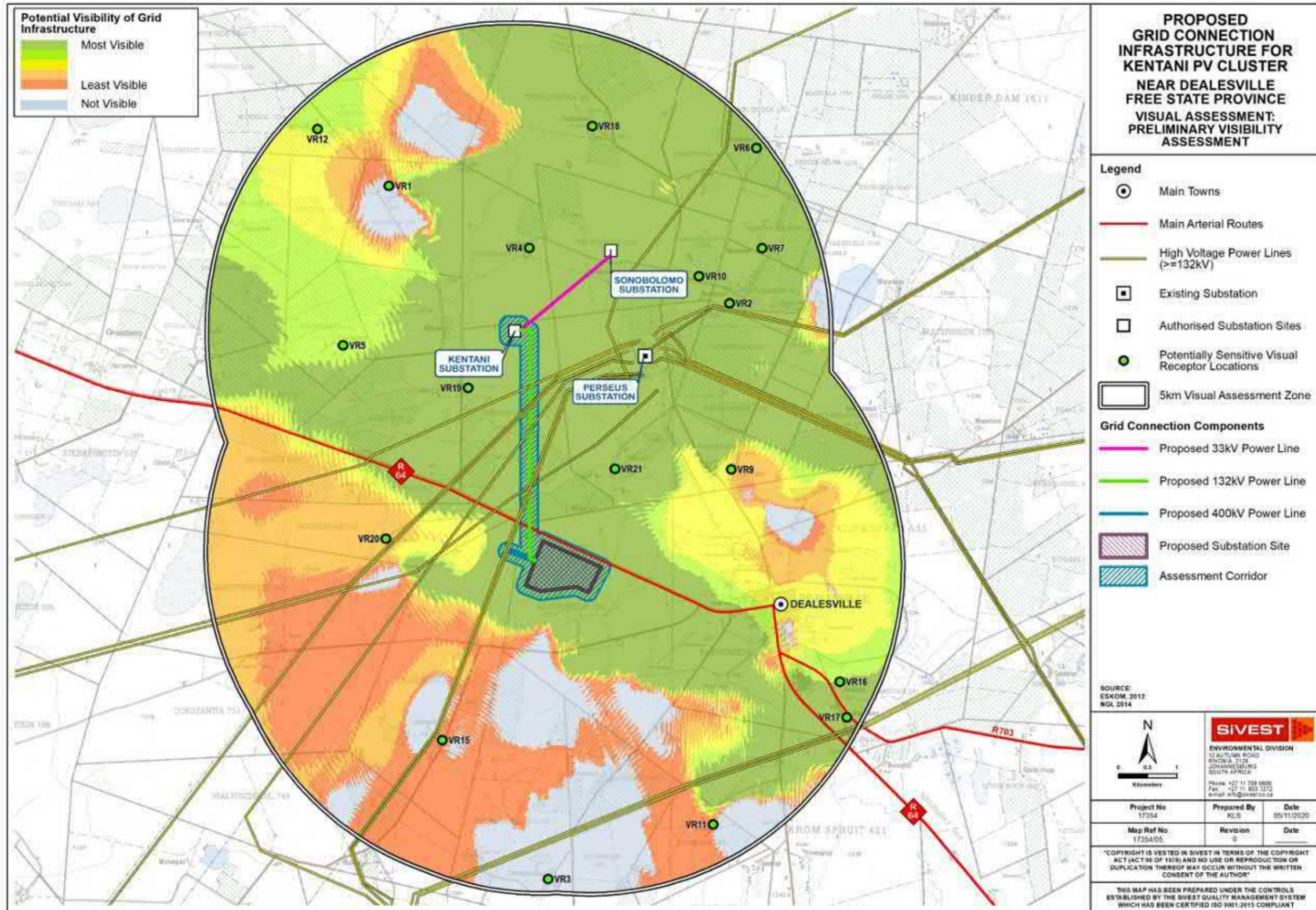
MAP 1: Topography



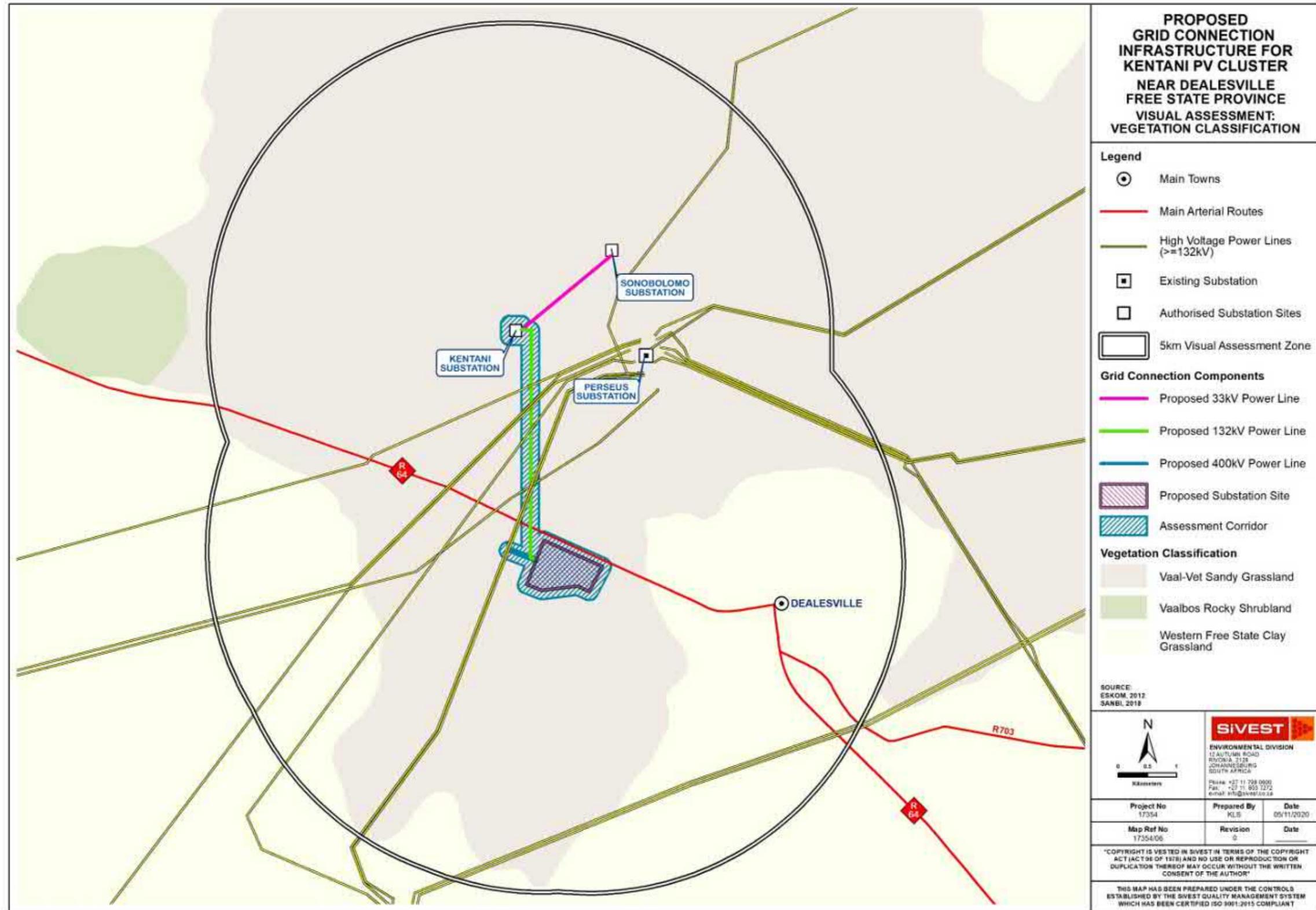
MAP 2: Slope



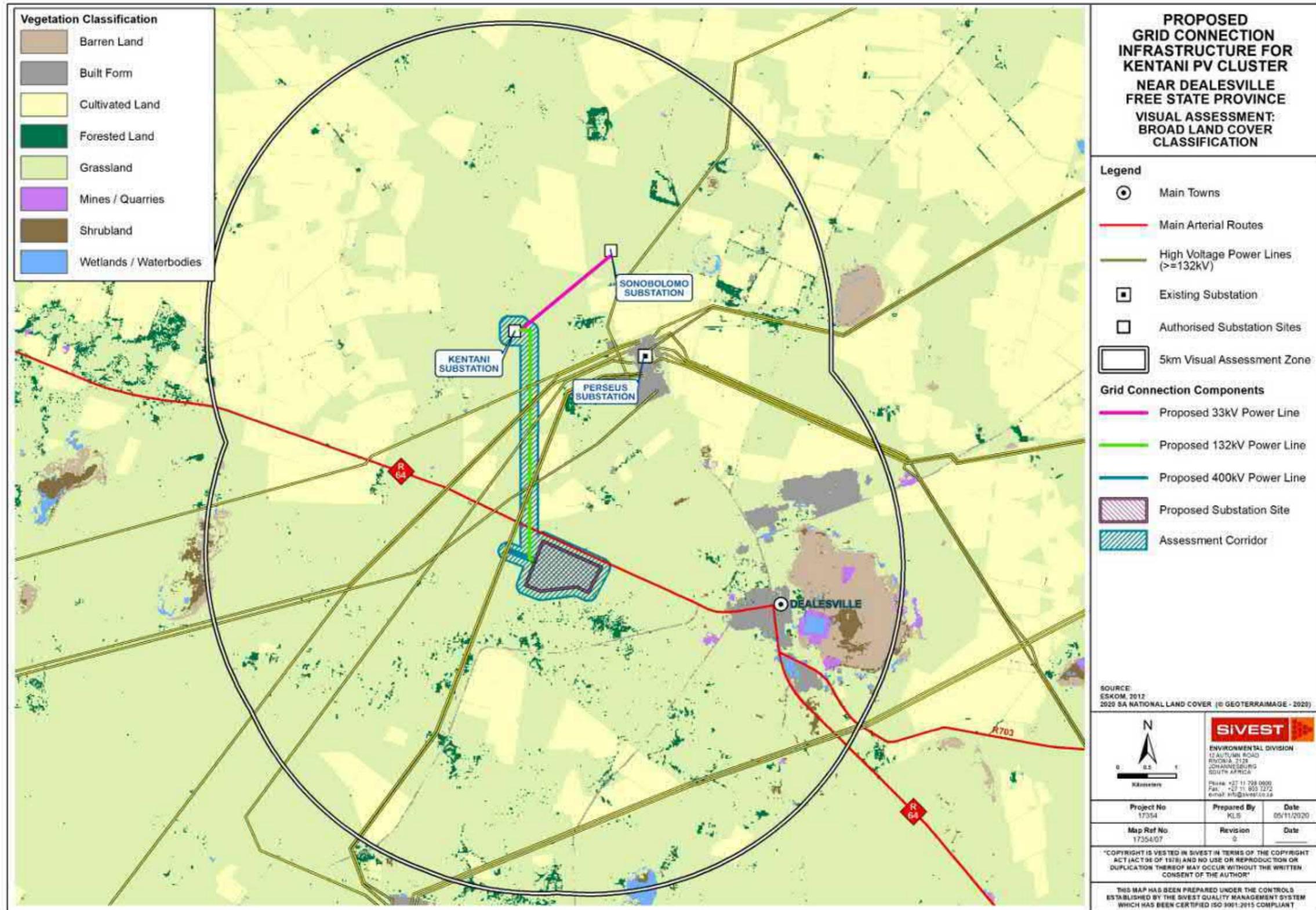
MAP 3: Potential Visibility of Power Lines and Substation



MAP 4: Vegetation Classification



MAP 5: Land Cover Classification



MAP 6: Potentially Sensitive Receptor Locations

