PALAEONTOLOGICAL SPECIALIST STUDY

In terms of Section 38(8) of the NHRA

Proposed development of the 132kV Oya Overhead Power Line near Matjiesfontein, Western and Northern Cape Provinces

Prepared by

Dewald Wilken

and

CTS HERITAGE

In Association with

Oya Energy (Pty) Ltd

October 2020

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THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I, **Dewald Wilken** as the appointed independent specialist hereby declare that I:

• act/ed as the independent specialist in this application;

• regard the information contained in this report as it relates to my specialist input/study to be true and correct, and

• do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• have and will not have no vested interest in the proposed activity proceeding;

• have disclosed, to the applicant, EAP and competent authority, any material information that have 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 NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;

• have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;

• have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

• have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;

• have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favorable to the applicant or not; and

• am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

Signed:

Name: Dewald Wilken

Date: 29 October 2020

CTS Heritage
16 Edison Way, Century City, Cape Town, 7441
Tel: (021) 0130131 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com

EXECUTIVE SUMMARY

Oya Energy (Pty) Ltd is proposing to construct a 132kV overhead power line and 33/132kV substations near Matjiesfontein in the Western and Northern Cape Provinces. A palaeontological Impact assessment was conducted to comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

This power line and substations will be installed over The Abrahamskraal Formation of the Beaufort Group, the Waterford Formation, Skoorsteen Formation, Tierberg Formation, Prince Albert Formation of the Ecca Group, and the Dwyka Group.These formations range from highly sensitive to not sensitive on the Palaeontological sensitivity Map.

Although the Abrahamskraal formation is highly sensitive, as it could contain the Tapinocephalus Assemblage Zone, fossils in this area are rare and unpredictably located. The chance of finding a fossil in the area during development is low, but possible. For this reason, a Chance Fossil Find Procedure is added to the end of this report. As far as the palaeontology is concerned the project may proceed.

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1. INTRODUCTION

1.1 Background Information on Project

Oya Energy (Pty) Ltd (hereafter referred to as "Oya Energy") is proposing to construct a 132kV overhead power line and 33/132kV substations near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the "proposed development"). The overall objective of the proposed development is to feed the electricity generated by the proposed Oya Energy Facility (part of separate on-going EIA process with DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the nearby developments into the national grid. The grid connection and substations (this application) requires a separate EA, in order to allow the EA to be handed over to Eskom. The proposed power line and substation development is located in the Witzenberg and Karoo Hoogland Local Municipalities respectively, which fall within the Cape Winelands and Namakwa District Municipalities.

The entire extent of the proposed overhead power line and substation development is located within one (1) of the Strategic Transmission Corridors as defined and in terms of the procedures laid out in GN No. 1131, namely the Central Corridor. The proposed overhead power line and substation project will irrespective of this be subject to a BA process in terms of the 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 DEFF.

At this stage, it is anticipated that the proposed development will include a 132kV power line and 33/132kV substations to feed electricity generated by the renewable energy facilities owned by the applicant into the national gird at the Kappa substation.

The type of power line towers being considered at this stage include both lattice and monopole towers and it is assumed that these towers will be located approximately 200m to 250m apart. The towers will be up to 45m in height, depending on the terrain, but will ensure minimum overhead line clearances from buildings and surrounding infrastructure.

300m wide power line corridors (i.e. 150m on either side) are being assessed to allow flexibility when determining the final route alignment. The proposed power line however only requires a 31m wide servitude and as such, this servitude would be positioned within the assessed corridor.

The size of the proposed Oya and Kudusberg substation and O&M building sites will be approximately 4 hectare (ha) each. It should be noted that only one (1) route is possible for the section of the proposed power line which connects the Kudusberg on-site substation (authorised under 14/12/16/3/3/1/1976/AM1) to the Oya on-site substation (i.e. Kudusberg to Oya). No alternatives can therefore be provided for this section of the power line. The Kudusberg to Oya power line corridor route is approximately 16.6km in length and runs from the Kudusberg on-site substation along the RE/194, 1/158, RE/159, RE/156, 1/156 and RE/155 properties to the Oya on-site substation.

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Five (5) power line corridor route alternatives have however been provided for the section of the proposed overhead power line which connects the Oya on-site substation to the Kappa substation (i.e. Oya to Kappa). The above-mentioned alternatives are described below:

- **Power Line Corridor Alternative 1 (Oya to Kappa):** Approximately 34.14km in length and runs along the RE/155, RE/152, 2/152, RE/169, RE/243, 241, 240 and RE/244 properties to the Kappa substation
- **Power Line Corridor Alternative 2 (Oya to Kappa):** Approximately 32.43km in length and runs along the RE/155, 3/155, RE/152, 2/152, RE/169, 13/168, 5/168, 1/243, RE/243, 241 and 240 properties to the Kappa substation
- **Power Line Corridor Alternative 3 (Oya to Kappa):** Approximately 30.56km in length and runs along the RE/155, 4/168, 13/168, 5/168, 1/243, 240 and RE/244 properties to the Kappa substation
- **Power Line Corridor Alternative 4 (Oya to Kappa):** Approximately 32.94km in length and runs along the RE/155, 4/168, 13/168, RE/169, RE/243, 241 and 240 properties to the Kappa substation
- **Power Line Corridor Alternative 5 (Oya to Kappa):** Approximately 32.26km in length and runs along the RE/155, RE/152, 2/152, RE/169, 5/168, 1/243 and 240 properties to the Kappa substation

The power line corridor routes mentioned above provide different route alignments contained within an assessment corridor of up to approximately 300m wide. This is to allow for flexibility to route the power line within the authorised corridors.

- '**No-go' alternative:** The 'no-go' alternative is the option of not fulfilling the proposed project as well as prevent the connection of the energy development in the area to feed electricity into the national grid. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the 'no-go' option would entail no development. The affected properties are currently not used for agricultural activities, although they are suitable for very low-level grazing.

The 'no-go' option is a feasible option, however, this would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of the renewables sector

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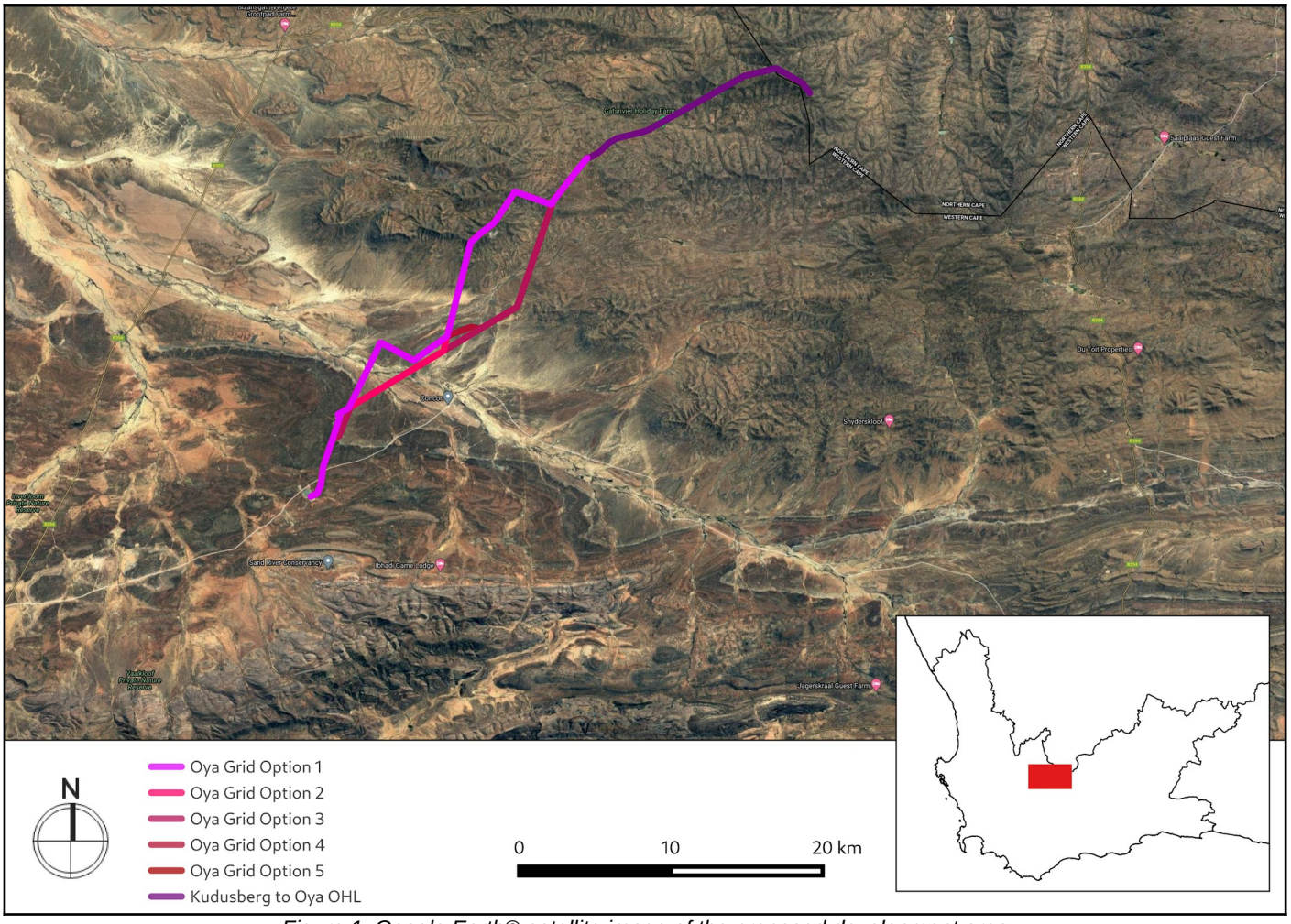

Figure 1. Google Earth© satellite image of the proposed development area

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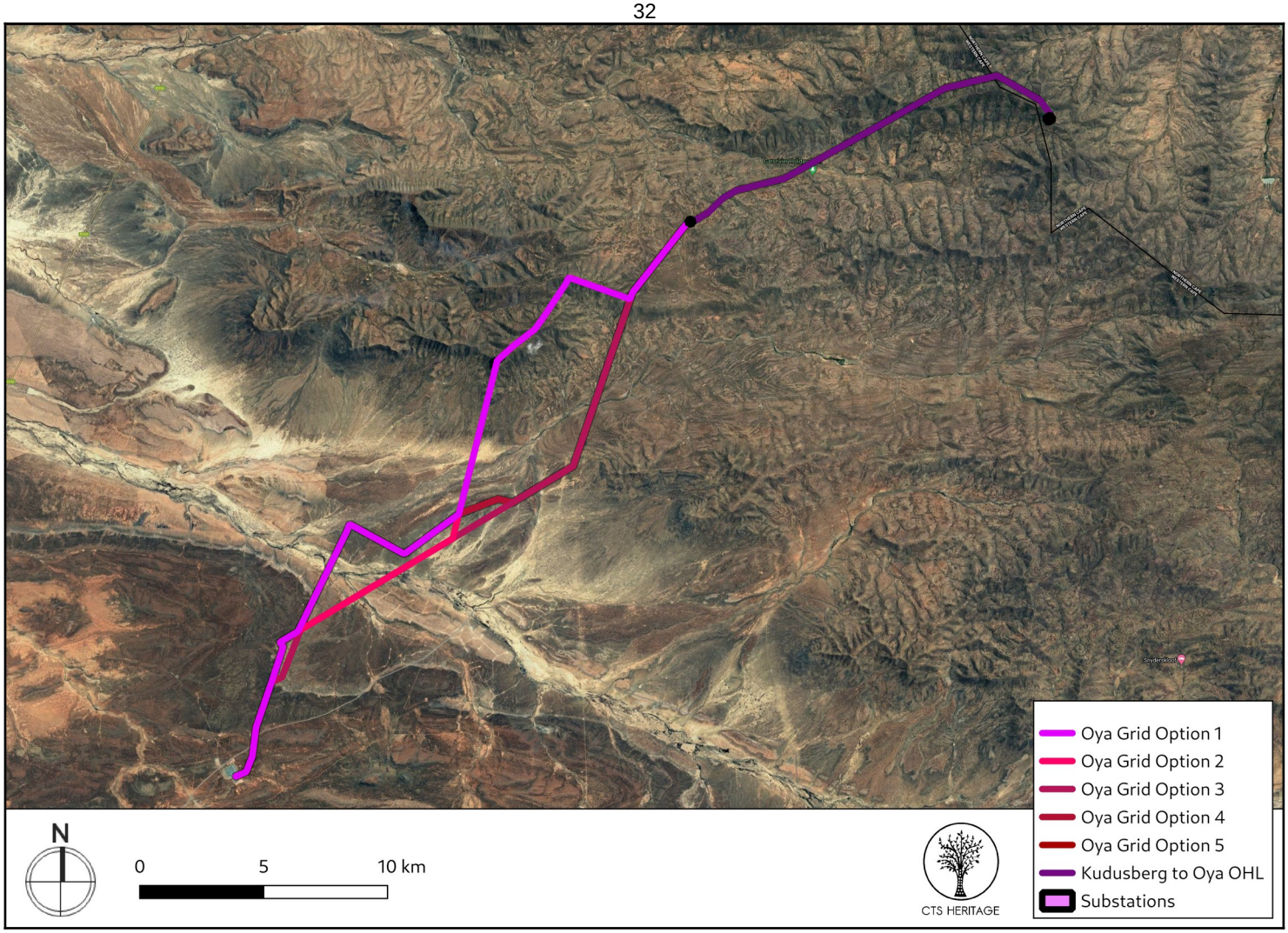

Figure 2. Google Earth© satellite image of the proposed development.

2. METHODOLOGY

2.1 Purpose of Palaeontological Study

According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments that are of low, moderate, high and very high palaeontological sensitivity (Figure 3). Based on the very high palaeontological sensitivities indicated, it is recommended that a palaeontological field assessment of the areas proposed for development is completed and anticipated impacts to such resources assessed. The resulting Palaeontological Specialist Assessment will be integrated into the Heritage Impact Assessment completed for the proposed development and will be submitted to SAHRA and HWC for comment in terms of section 38(8) of the NHRA.

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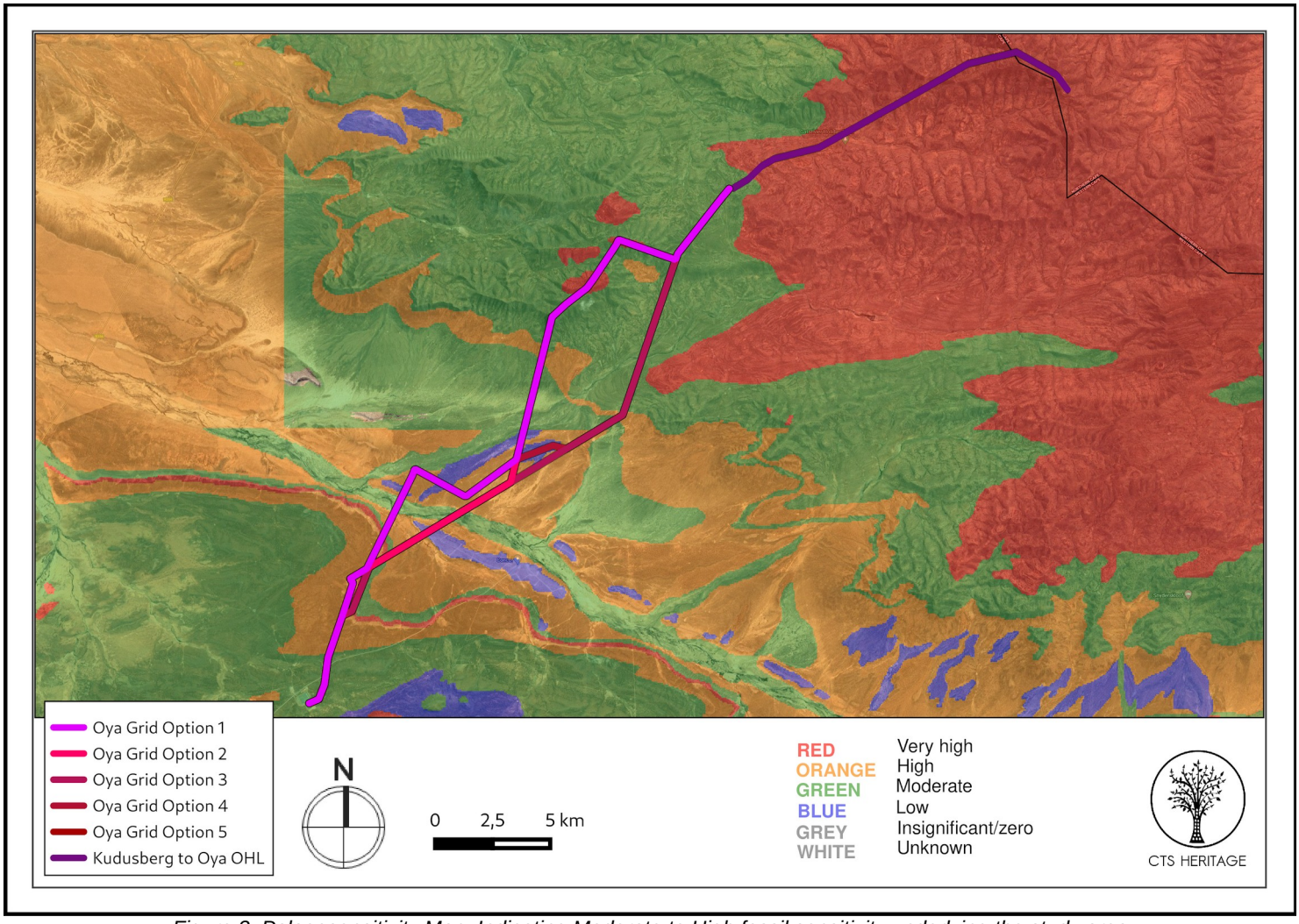

Figure 3. Palaeosensitivity Map. Indicating Moderate to High fossil sensitivity underlying the study area

2.2 Study approach

This PIA report provides a record of the observed or inferred palaeontological heritage resources within the broader project study area. The identified resources have been assessed to evaluate their heritage significance in terms of the grading system outlined in Section 3 of the NHRA (Act 25 of 1999). Recommendations for specialist palaeontological mitigation are made where this is considered necessary. The report is based on (1) a review of the relevant scientific literature, (2) previous palaeontological impact assessments in the broader study region (*e.g.* Almond 2008; 2015, 2020) (3) published geological maps, project data, Google Earth satellite imagery and accompanying sheet explanations, and (4) a field study of the area conducted from 18 – 22 October 2020.

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3. GEOLOGICAL AND PALAEONTOLOGICAL CONTEXT OF THE STUDY AREA

According to the extract from the Council for GeoScience Map 3220 for Sutherland (Figure 4) and Map 3320 for Ladismith (Figure 5), the area proposed for development is underlain by sediments of the Karoo Supergroup assigned to the Dwyka, Ecca and Witteberg Groups in addition to Quaternary Sands. The Dwyka Group is known to preserve trace fossils, organic-walled microfossils, rare marine invertebrates (*e.g.* molluscs), fish, vascular plants, predominantly interglacial and post-glacial trace fossil assemblages, possibility of body fossils (*e.g.* molluscs, fish, plants). The Ecca Group is known to conserve non-marine trace fossils, vascular plants (including petrified wood) and palynomorphs of *Glossopteris* flora, mesosaurid reptiles, fish (including microvertebrate remains, coprolites), crustaceans, sparse marine shelly invertebrates (molluscs, brachiopods), microfossils (radiolarians *etc.*) and insects. The Witteberg Group is very palaeontologically sensitive and is known to conserve trace fossils, vascular plants, sparse shelly invertebrates and fish (brachiopods, bivalves *etc.*). In the palaeontological assessment completed for the Oya Energy Facility, Almond (2020) concluded that the Oya project area has low paleontological sensitivity overall, but with small unpredictable areas of high to very high sensitivity. It is therefore likely that the proposed development will impact on significant palaeontological heritage and as such, an assessment of impacts to palaeontological resources is recommended for the portions of the proposed OHL alternatives that have not been previously assessed. Table 1 shows a summary of the geology and palaeontology directly underlying the OHL development.

Table 1. a Summary of the Groups and Formations, with lithology, age and known fossil occurrences, underlying the OHL and substation development.

Symbol	Group	Formation	Lithology	Approximate Age	Palaeontology
Pa	Beaufort, Adelaide Subgroup	Abrahamskraal	Green to blue-grey mudstones	266 – 250 Ma	Bioturbation, Trance fossils ~Tapinocephalus Assemblage Zone
Pko	Ecca	Waterford Fm. (Old Koedoesberg Fm.)	Shales, siltstones, sandstones.	290 – 266 Ma	Wave ripples, silicified wood, Trace fossils.
Ps		Skoorsteensberg	Sandstone interbedded with shale		Trace fossils, Glossopteris
Pt		Tierberg	Dark shales, yellow tuffs.		Invertebrate fossils, sponge spicules, trace fossils, fish scales
Pp		Prince Albert	Shales, wackes, arenite.		Marine invertebrates, fish (Dwykaselachus *oosthuizeni*), coprolites.
C-Pd	Dwyka		Diamictites	290 – 317 Ma	Wood, trace fossils, invertebrates, polen.

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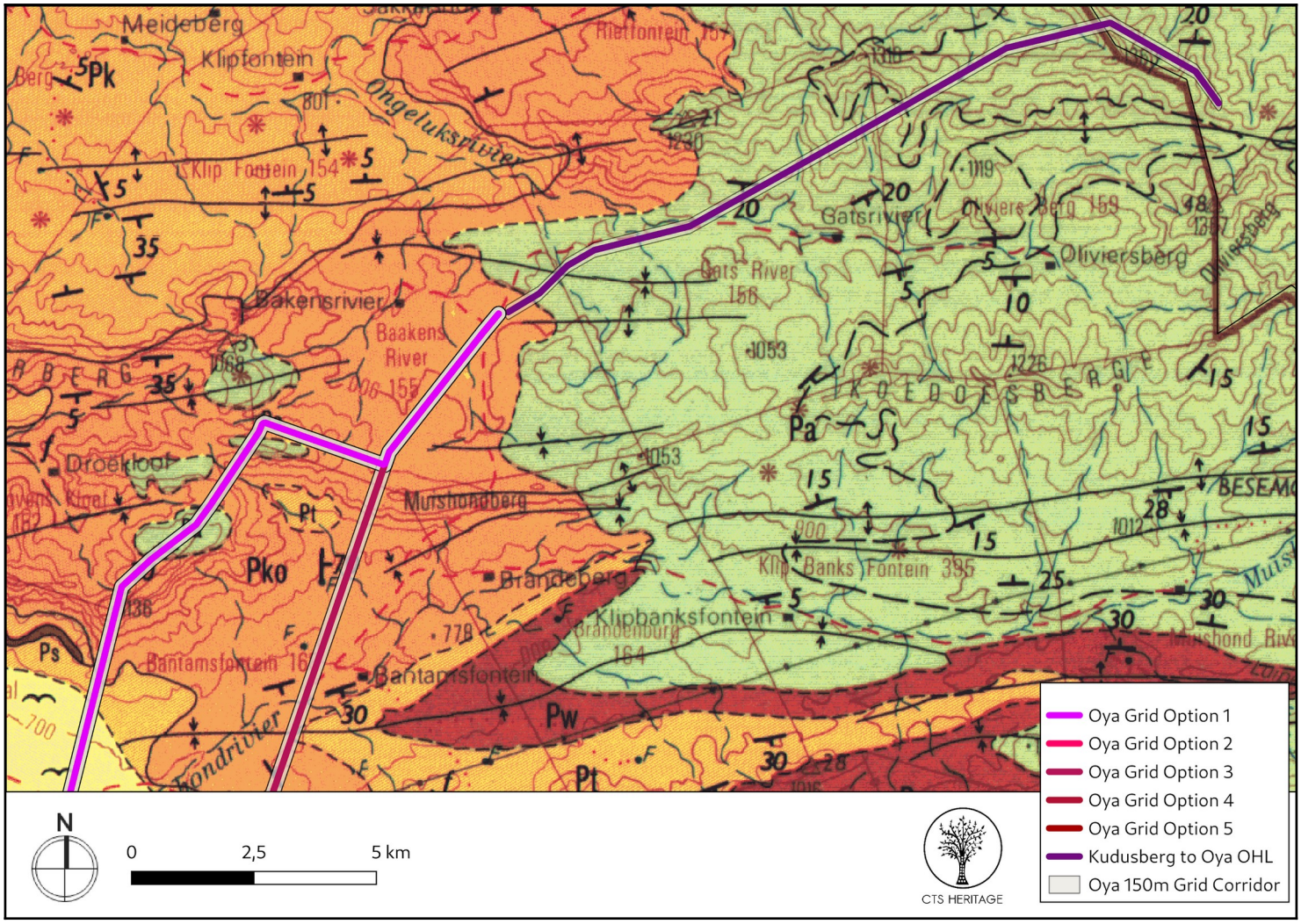

Figure 4. Geology Map. Extract from the CGS 3220 Sutherland Map indicating that the northern portion of the development area is underlain by sediments of the Karoo Supergroup assigned to the Tierberg (Pt) and Koedoesberg (Pko) formations of the Ecca Group, as well as the Abrahamskraal Formation (Pa) of the Beaufort Group and Quaternary Sands

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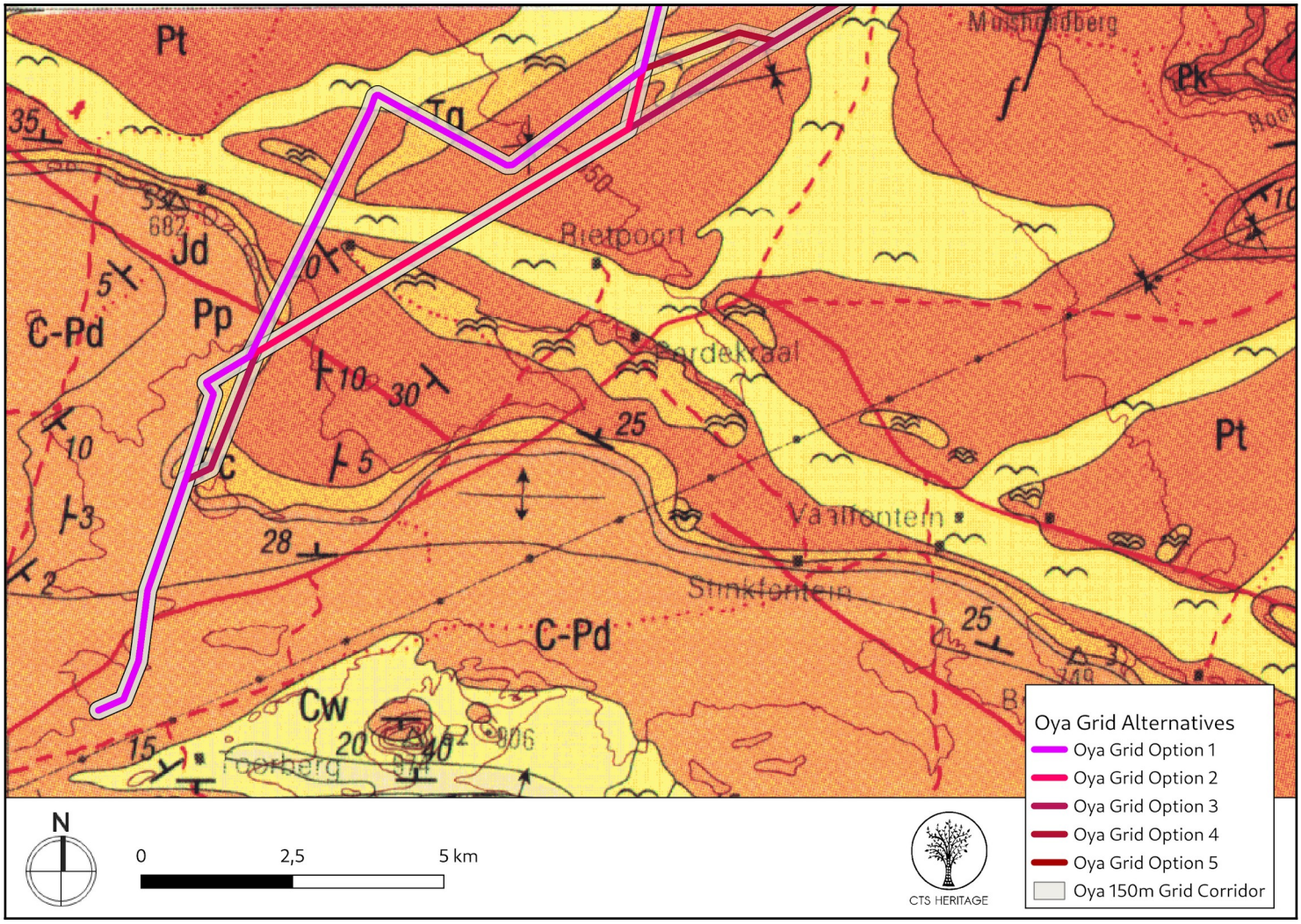

Figure 5. Geology Map. Extract from the CGS 3320 Ladismith Map indicating that the development area is underlain by sediments of the Karoo Supergroup assigned to the Dwyka group (C-Pd), as well as the Prince Albert (Pp), Tierberg (Pt) and Collingwood (Pc formations of the Ecca Group, as well as the Waaipoort (Cw) formation of the Witteberg Group and Quaternary Sands (Tg)

The following section will provide a summary of the geology and palaeontology of the formations that underlie the OHL and substation development.

3.1. Beaufort Group

3.1.1. Abrahamskraal Formation

The rocks of the Abrahamskraal Formation are generally green-grey to blue-grey mudstones, although grey-red, red-brown, or purple mudstones are also found. Calcareous nodules are present, these nodules tend to weather out brown. Within these mudstone layers fine grained green-grey sandstones are found, usually showing an upward fining trend. These sandstones can range from metres to tens of metres in thickness in some areas. These sandstone layers are important stratigraphic markers for geologists and palaeontologist. (Manson, (2007). These mudstones are also interbedded with siltstone beds. These sedimentary rocks tend to reveal a depositional environment in a retro-arc foreland basin (Karoo Basin), where sediment was deposited in a low energy alluvial plain flowing to the north. As indicated by fluvial and lacustrine sediments. (Johnson et al. 2006)

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The lower part of the Formation is seen as deltaic (green-grey, blue-grey mudstones) while the upper part of the Formation is seen as fully terrestrial (often indicated by the red mudstones).

The Abrahamskraal Formation correlates well with the Tapinocephalus Assemblage Zone. Therapsids, pareiasaur reptiles and fish fossils have been sparsely reported in this Formation. Plant material (e.g. sphenophyte ferns, fossil wood), freshwater invertebrates (principally smooth-shelled bivalves; and a range of trace fossils including tetrapod trackways (e.g. temnospondyl amphibians, therapsids) have been found.

3.2. Ecca Group

3.2.1. Waterford Formation (previously Carnarvon Fm /Koedoesberg Fm)

The thickness of the Waterford Formation fluctuates between 200m and 800m. The Formation consists of fine-grained sandstones and mudrock or clastic rhythmite units. The individual sandstone units have an average thickness of 6m, with 18m being the maximum. These units are mostly structureless, but horizontal lamination, low angle crossbedding and ripple lamination is found in some areas. Oscillation ripples are more common. The Formation is characterised by ball and pillow structures, as well as other water escape features. Thin mud-flake conglomerates area occasionally found. Brown weathering calcareous concretions can be found in the sandstone and mudstone. Wave ripples indicate a shallow sedimentary environment, in a delta front area / storm dominated shelf. (Johnson et al. 2006)

The Formation is mostly known for petrified wood and other plant material of the Glossopteris Flora (e.g. Glossopteris, Phyllotheca). Large fossil logs (“Dadoxylon”) showing seasonal growth rings are found. Two different genera of gymnospermous woods, Prototaxoxylon and Australoxylon, have been identified (Bamford 1999, 2004). Rolled vertebrate bone fragments, low intensity bioturbation, and trace fossils also found.

3.2.2. Skoorsteen Formation

The Skoorsteen Formation is a lens shaped arenaceous unit. It consists of five sandstone rich units of about 60m in thickness, this brings the total thickness of the Skoorsteen Formation to about 250m. These sandstone units are separated by shale units. A single sandstone is usually about 6m thick, with well-defined upper and lower boundaries. These sandstones are mostly massive, but have been found to contain convolute bedding, rip-up clasts, load clast, dewatering structures, climbing ripple lamination, and sole marks of both physical and biogenic origin. Typical Bouma turbidite sequences area common indicating an unstable delta front slope as a depositional environment of about 500m under water. Trace fossils are found in the form of horizontal feeding traces. Plant fragments of Glossopteris like flora is common. (Johnson et al. 2006)

3.2.3. Tierberg Formation

The Tierberg Formation ranges in thickness form 700m in the west to 350m in the north east. It is a predominantly argillaceous Formation which grades upwards into the Waterford Formation. These grey mudrock and fine sandstones

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where deposited of shore in an inland sea, with influences of offshore fans, and distal pro-deltaic deposition. There is some occurrence of yellow tuffaceous layers of up to 10cm thick in the lower part of the succession.

The Tierberg Formation is known for a wide range of both vertebrate and invertebrate trace fossils, these include, fish swimming trails (Undichna), crustacean trackways (Umfolozia), arthropod feeding marks (Vadoscavichna) and resting traces (Quadrispinichna / Broomichnium). Boddy fossils are mostly found in the form of plant remains of glossopteris including fossilised wood. Some micro vertebrate remains have been reported. Prinsloo (1989)

3.2.4. Prince Albert Formation

This formation is confined to the south western half of the karoo basin. The thickness of the formation is very variable and range from 10 to 300m. The Formation is divided into a northern and southern facies. The northern facies contain grey to olive green micaceous shales, grey silty shales, and carbonaceous shales, arenites and wackes. It shows a pronounced transition into the underlying glacial deposits. It also contains ice rafted debris, and fossils of cephalopods, lamellibranches, brachiopods, fish remains, coprolites and plant matter.

The southern facies consist of dark grey, pyrite bearing splintery shales, dark coloured cherts, carbonate concreations and phosphatic nodule lenses. Fossils remains of shark, sponge spicules, foraminifera, radiolaria and acritarchs have be found. (Johnson et al. 2006)

3.3 Dwyka Group

Dwyka rest on glaciated Precambrian bedrock. The main sedimentary environment is thought to be in a marine basin. The Group Is known for a massive diamictite facies, these facies contain highly compressed, mostly clast rich diamictite. It attains its greatest thickness in the south where it reaches 800m. The Dwyka Group is known for low diversity plant fossils due the cold glacial environment during deposition. Coprolites fish trace fossils, crustaceans and arthropods have been found in this Group. (Johnson et al. 2006)

4. PALAEONTOLOGICAL HERITAGE RESOURCES

4.1. Review of regional palaeontology

The proposed development spans over three Groups and five formations. All these formations could contain fossils. As seen in Table 1 these could include Plant fragments, silicified wood, multiple trace fossils, coprolites, crustaceans, arthropods and vertebrate bone fragments.

Of these formations the Abrahams kraal Formation is the most sensitive as it contains the Tapinocephalus Assemblage Zone (AZ) (see Figure 6 and Figure 7) which spans the middle part of the Abrahamskraal Formation. Vertebrate fossils of the Tapinocephalus AZ are not as common as in succeeding biozones and are usually found as individual specimens in the mudrock sequences in association with, and often enveloped by, brown-weathering calcareous nodular material. This faunal assemblage is mainly represented by small dicynodonts, large dinocephalians, pareiasaurs and pristerognathid therocephalians. The dinocephalians which consist of Synapsida and Therapsida dominated as one of the tetrapod groups in the Middle Permian. The Tapinocephalus Assemblage Zone (AZ) in the Main Karoo Basin holds the most abundant record of

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these dinocephalians. The top of the Abrahamskraal Formation marks the extinction of the dinocephalians. Their disappearance is one of the criteria that marks the beginning of the Pristerognathus AZ.

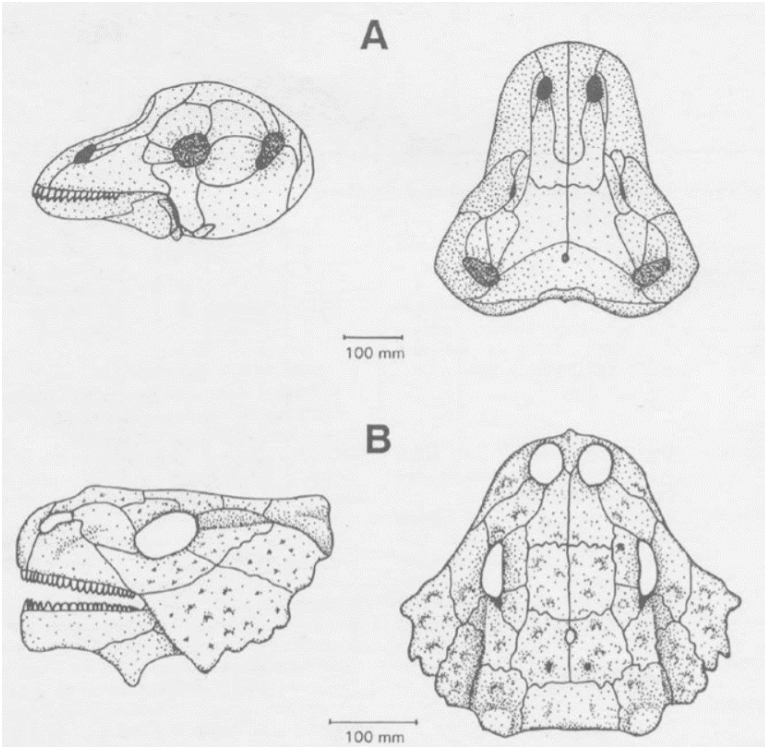

Figure 6 Lateral and dorsal views of biozons-defining fossils of the Tapinocephalus Assemlage Zone. A. Tapinocephalus; B. Bradysaurus modified after Boonstra, 1969 (Rossouw, L. 2019)

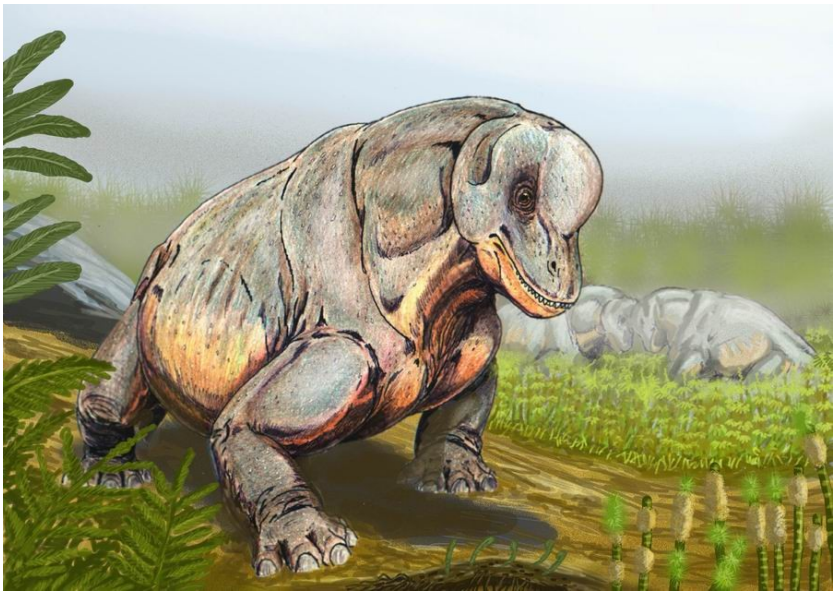

Figure 7 Artist rendition of Tapinocephalus

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4.2. Summary of Palaeontological resources identified.

No significant fossils were identified during the field analysis. This is mostly due to the soils cover and lack of outcrop in the area as can be seen in Figure 8 and Figure 9. Fossils were only found in the Abrahamskraal Formation. These can be seen in Table 2. The fossils found were all silicified wood. None of the samples were found in situ.

Figure 8 Soil cover to the south of the proposed development.

Figure 9 Lack of outcrop to the south of the proposed development.

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Table 2 Summary of geology and palaeontological heritage significance

GPS	GEOLOGY	FOSSILS OBSERVED	COMMENTS	PHOTO
32°56'03.34"S 20°10'36.16"E	Abrahamskraal Formation	Silicified Wood	Not in situ	
32°59'38.86"S 20°09'19.23"E	Abrahamskraal Formation	Silicified Wood	Not in situ	
32°59'27.83"S 20°09'34.20"E	Abrahamskraal Formation	Silicified Wood	Not in situ	
32°57'57.33"S 20°10'27.62"E	Abrahamskraal Formation	Silicified Wood	Not in situ	

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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

The proposed development is underlain by potentially fossiliferous sediment of the Karoo Suppergroup. These include daltaic and marine deposits of the Waterford Formation, Tierberg Formation, Skoorsteen Formation, Prince Albert Formation, containing plant and trace fossils, crustaceans, and arthropods, the Dwyka Group glacial sediments, but most importantly the Abrahamskraal Formation with the Tapinocephalus Assemblage Zone. Scientifically valuable, well-preserved fossils are exceedingly rare in this area, with an unpredictable distribution. For this reason, it is unlikely that the development will have a significant effect on the area, provided that the chance fossil find procedure is followed in the possible case of a fossil being found.

Table 3 Impact Assessment Criteria

Criteria	Category	Explanation
Overall Nature	***Low***	Possible fossils in the construction footprint could be destroyed Impact will remain negligible if the Chance Fossil Find Procedure is followed
Type	***Direct***	The development will directly impact these resources
Extent	***Site***	Impact is limited to the OHL power line and substation area
Duration	***Permanent***	Likely impacts will affect the heritage resources identified permanently
Severity	***Low***	The site is partly located on very sensitive palaeontological strata but fossils in this Formation is Rare. Impact will remain negligible if the Chance Fossil Find Procedure is followed in the case of any fossil finds.
Reversibility	***Irreversible***	The impact cannot be reversed, regardless of the mitigation or rehabilitation measures.
Irreplaceable Loss	***Resource may be partly destroyed***	Partial loss or destruction of the resource might occur but can be mitigated if the Chance Fossil Find Procedure is followed.
Probability	***low***	The site is partly located on very sensitive palaeontological strata but fossils in this Formation is Rare. Impact will remain negligible if the Chance Fossil Find Procedure is followed in the case of any fossil finds.
Mitigation Potential	***High***	If the Chance Fossil Find Procedure is followed in the case of any fossil finds.
Impact Significance	***Negligible***	Impact significance will remain negligible if the Chance Fossil Find Procedure is followed

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6. ASSUMPTIONS AND UNCERTAINTIES

Based on the palaeontological record and the geology of the area it is assumed that the area contains plant, invertebrate and vertebrate fossils, trace fossils should also be common. These fossils are often found as individual specimens.

"The key assumption for this scoping study is that the existing geological maps and datasets used to assess site sensitivity are correct and reliable. However, the geological maps used were not intended for fine scale planning work and are largely based on aerial photographs alone, without ground-truthing. There is also an inadequate database for fossil heritage for much of the RSA, due to the small number of professional palaeontologist carrying out fieldwork in RSA. Most development study areas have never been surveyed by a palaeontologist.

These factors may have a major influence on the assessment of the fossil heritage significance of a given development and without supporting field assessments may lead to either:

- an underestimation of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or
- an overestimation of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by weathering, or are buried beneath a thick mantle of unfossiliferous "drift" (soil, alluvium etc.)." Groenewald (2016)

7. CONCLUSION AND RECOMMENDATIONS

The proposed OHL and substation development may proceed. It is unlikely that this construction will have a great effect on significant palaeontological heritage. Although the area has a rich occurrence of multiple fossil assemblages, fossil finds are often isolated as individuals. Fossils identified were all silicified wood. It is recommended that the responsible ECO monitor the material extracted during excavation.

Alternative 4 is preferred by the developer, and in light of the above information, also in terms of impacts to palaeontological resources. The proposed development is unlikely to have a negative impact on significant palaeontological resources situated within the corridor for the proposed Oya OHL and substations. The proposed layout is acceptable from a palaeontological perspective and should be approved as part of the EA on condition that the proposed mitigation measures including buffer areas and no-go areas are implemented.

Should important new fossil remains - such as insects, vertebrate bones and teeth, petrified wood, plant-rich fossil lenses or dense fossil burrow assemblages - be exposed during construction, the responsible Environmental Control Officer should alert HWC (i.e. Heritage Western Cape. Contact details: Waseefa Dhansay, 021 483 5959, waseefa.dhansay@westerncape.gov.za) as soon as possible. This is so that appropriate action can be taken in good time by a professional palaeontologist at the developer's expense. Palaeontological mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as of associated geological data (e.g. stratigraphy, sedimentology, taphonomy). The palaeontologist concerned with mitigation work will need a valid fossil collection permit from HWC and any material collected would have to be curated in an approved depository (e.g. museum or university collection).

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All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies recently developed by SAHRA (2013). These recommendations are summarized in tabular form in Appendix 1 (Chance Fossil Finds Procedure) and should be incorporated into the Environmental Management Programme (EMPr) for the proposed development.

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APPENDIX 1: Fossil Finds Procedure

Chance Fossil Finds Procedure

(Adopted from the HWC Chance Fossils Finds Procedure: June 2016)

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training

Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken

One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material. Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.

Procedure to follow if it is likely that the material identified is a fossil:

- The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found;

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- The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates;
- The ECO or site agent must compile a Preliminary Report and fill in the attached Fossil Discoveries: Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:
- The date
- A description of the discovery
- A description of the fossil and its context (e.g. position and depth of find)
- Where and how the find has been stored
- Photographs to accompany the preliminary report (the more the better):
- A scale must be used
- Photos of location from several angles
- Photos of vertical section should be provided
- Digital images of hole showing vertical section (side);
- Digital images of fossil or fossils.

Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

- Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sandbags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.
- If the find cannot be stabilised, the fossil may be collected with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove all the fossil material and any breakage of fossil material must be avoided at all costs.

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No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed.

FOSSIL DISCOVERIES: PRELIMINARY RECORDING FORM		
Name of project:		
Name of fossil location:		
Date of discovery:		
Description of situation in which the fossil was found:		
Description of context in which the fossil was found:		
Description and condition of fossil identified:		
GPS coordinates:	Lat:	Long:
If no co-ordinates available then please describe the location:		
Time of discovery:		
Depth of find in hole		
Photographs (tick as appropriate and indicate number of the photograph)	Digital image of vertical section (side)	
	Fossil from different angles	
	Wider context of the find	
Wider context of the find. Temporary storage (where it is located and how it is conserved)		
Person identifying the fossil Name:		
Contact:		
Recorder Name:		
Contact:		
Photographer Name:		
Contact:		

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